CW SAMPLE COPY
MI 310 3UIVYMUIVYM FCWB FC
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48103

NEWSPAPER

V12 14

APR 3 78

UMI

Merry Christmas, Mr. President

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – If things go the way Carl Calo hopes they will, President Carter and his staff may get a present next Christmas that could prove an interesting contrast to the antiques in the White House.

Calo, who heads DP operations for the Executive Office of the President (EOP), is getting ready to shop for computer power. He would like to see on the desks of his users – except in the Oval Office itself – multifunction terminals that would handle electronic mail, word processing and a variety of other applications.

The applications shopping list is long and includes such items as a scheduling and time management system for the President and Vice President, a correspondence generating and tracking system, a data base of Presidential statements and formal policy positions, access to agency program data and economic models, on-line information for use in crisis situations and control and tracking of assignments and requests by senior White House officials.

The system that would serve the EOP, comprised of 12 separate offices, must be flexible enough to adjust to changing administrations. Those served by the system include senior Presidential advisors, the Professional Policy and Planning Staff and the administrative aides, secretaries and special assistants who populate the EOP.

Officially the assistant director of the Information Systems Division in the EOP's Office of Administration, Calo will issue preliminary specifications this month for the information system he hopes to design.

"Capability-oriented" rather than hardware-oriented, these specifications will leave it to industry to come up with the best equipment and configuration for the total system the EOP seeks, he said.

(Continued on Page 6)

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.
Vol. XII, No. 14 April 3, 1978 75¢ a copy; $18/year

Gains in New Job Salaries Best for Systems Analysts

By Ann Dooley
CW Staff

NEW YORK – Starting salaries for systems analysts have risen significantly in the last year, outpacing the percentage increases experienced in other DP job categories, according to a report by Robert Half Personnel Agencies, Inc.

The yearly report is based on an analysis of position requests received by the agency's 55 offices in the U.S. and not on a random sampling of salaries presently being paid in DP installations.

Results showed that a systems analyst working in a large installation can earn $18,000 to $23,000 – a 13.9% increase over the salaries being offered to new recruits last year.

In a medium-sized installation, an analyst can also expect a significant rise in the pay scale to between $18,000 and $22,000, a 14.3% hike over last year, Half said.

Only in the small installations were gains more modest. There, an entering analyst can expect to earn between $16,000 and $18,500 for a percentage increase of 7.8%, the

(Continued on Page 4)

Congress Unit Set to Ponder:

DP Giving Incumbents an Edge?

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – Are computers and computer services – financed with tax dollars to help congressmen maintain constituent mailing lists and handle other "official" administrative duties – giving those incumbents an unfair advantage over their political opponents?

Congressional use of computers and franked (free) mail to manipulate the voters back home and to make incumbency an even more invulnerable position has become a troublesome issue in recent months, according to a staff member of the House Administration Committee's Policy Group on Information and Computers.

The committee will meet soon to spell out the "official" uses to which a legislator's computer system may be put. The question is a matter of ethics rather than legality, a congressional spokesman noted.

Recent publicity has made the public more aware that its tax monies are providing members of Congress with a powerful tool to assist their return to the legislature. This public pressure makes some resolution of the ethical questions involved in computer use by congressmen a high priority, congressional sources indicated here last week.

A recent study on expenditures by congressmen reported that 263 members of the 435 member House are spending a total of more than $2 million annually from their congressional allowances for office computer services.

Constantly under pressure to be well informed about an increasing variety

(Continued on Page 4)

IN DEPTH IN DEPTH

Are you spending long hours on the job but never getting everything done? There may be an alternative. See 'Structuring Your Workstyle,' beginning on Page 11.

IBM Adds 3033 MP – But It's Not a Bargain

By Ronald A. Frank
CW Staff

WHITE PLAINS, N.Y. – IBM has lashed together two of its most powerful mainframes into a multiprocessor (MP) configuration that can provide up to 16 million characters of storage.

The 3033 MP provides 1.6 to 1.8 times the instruction rate of a single 3033 processor when running similar programs under OS/VS2 MVS, IBM said.

Users who want the MP version will actually be paying more than the cost of having two free standing 3033 systems. On a purchase basis, an MP system will cost $400,000 more than two CPUs, IBM said.

The MP configuration is available with a combined total of 8 million to 16 million characters of storage, expandable in increments of 2 million characters, and each CPU memory can be accessed by both processors. A switching function permits program control of channel communications within the MP configuration.

Either processor can use the other's channels if one of the processors needs service or is not operational, a spokesman noted.

A communications unit, the Model 3038, connects the two CPUs and controls switching between the systems.

Two groups of six channels are standard on each CPU and an optional group of four channels per CPU is available for a total of 16 channels per processor or 32 channels for a full MP configuration.

One CPU can support major por-

(Continued on Page 5)

Service Bureau Moves Itself From Path of Flood Waters

By Tim Scannell
CW Staff

PHOENIX – In a scene reminiscent of a Hollywood movie, a service bureau here was rescued from the path of flood waters produced by torrential rainfall, a swollen river and overburdened dams.

The threatened service firm – Automatic Data Processing, Inc. (ADP) – moved its entire operation – from computer hardware to warehouse forms – from its industrial park location to the safety of a temporary facility set up in a downtown Phoenix bank, according to Dave Hagan, manager of ADP's Commercial Services Center.

Center personnel received the warning of an imminent flood at noon on March 2 from police, who had been monitoring the rising waters of the nearby Salt River. State officials decided to unleash water from five overburdened dams in northeast Arizona to eliminate the danger of a dam burst in any one or all of the man-made retainers.

"Obviously an option was exercised by someone in authority for a smaller flood in lieu of a full blown catastrophe," Hagan stated.

(Continued on Page 6)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM reg U.S. Pat Off

EDITORIAL	
Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Assistant Editor	Frank Vaughan
Washington Bureau/ Chief	Edith Holmes
Staff Writers	Catherine Arnst Jeffry Beeler Timothy J. Scannell Brad Schultz Marguerite Zientara
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara J. VanScoyoc Susan Gerrard Joe Hunn
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger Frampton
Munich	Hans Jurgen Ballnath
Asia	Hidetsuna Sasaki
Contributors.	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone
SALES	
Vice President/ Marketing	Roy Einreinhofer
Advertising Administrator	Terry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Donna Whalen
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen
CIRCULATION	
Vice-President Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep	Peggy Kelly
Assistant	Eleanor Smith
PRODUCTION	
Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street Newton Mass 02160 Phone (617) 965-5800 Telex USA 92 2529

OTHER EDITORIAL OFFICES. England: Computerworld Publishing Ltd 2 Bath Road London W41LN Phone (01) 995 3352 Telex 934287 **W. Germany:** Computerworld c/o Computerwoche GmbH 8000 Munchen 40 Tristanstrasse 11 Phone 36 40 36 37 Telex 5215350 **Asia:** Computerworld c/o Dempa/Computerworld Company Dempa Building 1 11 15 Higashi Gotanda 1 chome Shinagawa Ku Tokyo 141 Phone (03) 445 6101 Telex J2424461

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except a single combined issue for the last week in December and the first week in January) by CW Communications Inc. Copyright 1978 by CW Communications Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy U.S. — $18 a year Canada and PUAS — $28 a year Europe and Middle East — $50 a year all other foreign — $65 a year Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept. 300 Zeeb Rd. Ann Arbor Mich. 48106 Phone (313) 761 4700. *Computerworld* is indexed; write to Circulation Dept for subscription information.

CW COMMUNICATIONS/INC	
Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan

ABP

POSTMASTER Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA 02160

HIS Vice-President Fighting Tardiness By Giving 'Turkey of the Month' Award

By Don Leavitt
CW Staff

PHOENIX — Sometimes it takes a touch of humor to bring common sense — and the desired action — to a deteriorating situation. At least that's what C. Walter Dix thought when he initiated the "Turkey of the Month" competition now under way at Honeywell Information Systems Inc.'s Large Systems Engineering Operations (LSEO) here.

The competition was triggered by a memo written last December by Dix, the mainframer's vice-president for engineering, who was concerned by early morning tardiness of LSEO employees.

Dix wasn't really worried about the few minutes lost from each tardy worker's day, he explained last week, he was worried about the morale of those who started work on time and then saw the latecomers drift in, apparently without penalty.

The "Turkey" contest — which "rewards" the LSEO section with the worst on-time record each month — has been quite successful. Although the vice-president declined to give the figures for on-time attendance in the HIS plant overall, he said LSEO's record has improved "significantly" and now stands at about 98%.

In the December memo in which he decried the development of a "don't care" syndrome in the face of unchecked tardiness, Dix set up the rules for the contest, with phrasing that mocked the language of many typical management pronouncements and captured the imagination of the managers and workers he was trying to reach.

The memo provided an elaborate formula for calculating the on-time performance of each LSEO unit. The logic of the calculation was sound but — important to Dix — it did not threaten any of the tardy workers personally. The formula was also structured so the tardiest unit "earned" the highest score.

Dix's second rule specified the highest ranked unit would win the Turkey of the Month Award, a good-looking plaque suitably inscribed with the "winning" manager's name, the vice-president said.

But the LSEO unit with the best on-time record for the month — the one with the lowest score according to Dix's formula — also gained special recognition. Workers in that unit were rewarded with privileged parking spaces instead of having to go through the usual scramble for whatever was available in the general parking lot.

January was a "shakedown" period for the competition, so no "Turkey" award was given that month, but the Multics Software Engineering Group "won" the award for February. Perhaps that's to be expected, according to one engineer who noted that software everywhere has a reputation for being late.

State Hearing Officer Gives 'Promis' Nod to Burroughs

By Brad Schultz
CW Staff

BOSTON — Burroughs Corp.'s hardware proposal to implement the first statewide Prosecutor's Management Information System (Promis) here meets the needs of the state, and the company won the contract in "open and free" competition, a bid protest hearing officer decided here last week.

Barbara Clurman's decision refuted claims by Honeywell Information Systems, Inc. and John L. Tobin, general counsel for the Massachusetts Committee on Criminal Justice (CCJ), that bids for the hardware were improperly evaluated and that Burroughs' proposal was not responsive to the Massachusetts Supreme Judicial Court's (SJC) stated requirements [CW, March 20].

Clurman's decision is only a recommendation — the CCJ Proposal Review Board will make its own decision, according to attorney Robert Bigelow.

Clurman presided over a two-day hearing last month to consider the two issues raised by Tobin and HIS and debated by a battery of lawyers: offensively, Tobin for the CCJ and Donna Sherry for HIS; defensively, Bigelow for the SJC and William McCormac for Burroughs.

HIS was the runner-up in the bidding competition that began last August and ended with the announcement in November of an $815,000 Burroughs award. The $1.2 million HIS proposal was rejected with those of eight others.

The money that may yet buy Burroughs' equipment and establish Promis comes from the U.S. Justice Department's Law Enforcement Assistance Administration (LEAA) and is administered by the CCJ, which suspended the procurement process pending its review of the bid award.

Bigelow expects the Proposal Review Board to rule in accord with Clurman's findings, but pointed out this type of protest review is unprecedented in the CCJ's experience and an overruling is possible.

In addition, he noted, HIS may take this matter further, appealing to the LEAA.

"Obviously, we are very pleased by the decision," Burroughs marketing manager Paul Connelly said. He added that Burroughs is anxious to get on with the job, which he called the first statewide judicial computerization.

On the Inside This Week

NEWS

In World Cup Mini Tallies Skiers' Standings . . . 5
Be Aware of Changing Attitudes, Attendees Told . . . 7
Tax Hearing Date Granted in California . . . 8
Rent or Buy? Look at Fiscal Profile, Users Told . . . 10
In-Depth: Structuring Your Workstyle . . . 11-15

HUMAN CONNECTION

Be Aware of Changing Attitudes, Managers Told . . . 7
Managers Called Integral to DPers' Career Plans . . . 9
Ethics Issues Prompt Thoughtful Responses . . . 17

EDITORIAL

Breach of Users' Trust . . . 16
Taylor Report: Rip-Offs Not Prosecuted . . . 17
Vendor Expects Codasyl DMBS From IBM . . . 18

SOFTWARE & SERVICES

DP Training Budgets Rising, BSI Finds . . . 19
Software Gets Bell Mail Drop . . . 20
Management Technique Slashes Redefinition . . . 21
NCR 499 Users Get Support in Applications Areas . . . 22
On-Line Stock Market Data Streamlines Trades . . . 24
Help Asked for Data Inventory . . . 26

COMMUNICATIONS

IBM Introduces RJE Protocol for SNA . . . 27
Wisconsin Center Keeps Net's Customers Up . . . 28
GA Announces 440 Gains Languages, 2780 Ability . . . 29
IUP From IBM Supports Health Care Facilities . . . 30
Key-to-Disk Net Tracks Aircraft Engine Parts . . . 31

SYSTEMS & PERIPHERALS

NCR Tops Off Mid-Scale N-8300 Line . . . 33
Processors Give Auto Club Same-Day Banking . . . 35
Plug-Compatible CPU to Link IBM Tellers . . . 36

MINIWORLD

Potential First-Time Users Get Briefing . . . 41
Disk-Based System Boon to Lumber Yard . . . 44
Cancer Laboratory's Mini Cuts Paperwork . . . 48
Small Business User Seen Misunderstood Breed . . . 49
Real-Time System Keeps Atlanta Maps Current . . . 50

MICROCOMPUTING

Micros Taking Over Auto Functions . . . 51
Datacube Adds Video Board . . . 54

COMPUTER INDUSTRY

Time Seen Ripe for IBM Move Toward Breakup . . . 59
Users See Series/1 as Bridge to IBM 380 . . . 59
Korea Struggling: 'Make or Buy or Assemble?' . . . 60
Business Uses Seen Boosting Micro Shipments . . . 61

ADR's ROSCOE®/RTS Brings Personal Computing to North Carolina State Highway Engineers

When the State Highway Department needed faster solutions to design and engineering problems, an interactive time-sharing system was their answer. Their first thought was TSO. But with their 370/158 already loaded with heavy CICS applications, TSO would have meant expensive system upgrading.

That's when they heard about ADR's ROSCOE Time-Sharing Option (RTS). It gives users full production time-sharing facilities for application programs in languages like Fortran, PL/1 and BAL.

"After using RTS for a month, it was clear that it would do the job we needed," said Engineering Programmer, Robert Wells. "With RTS, we could continue on VS1 and not have to go to MVS, as we would have with TSO. And machine overhead was about 70% less.

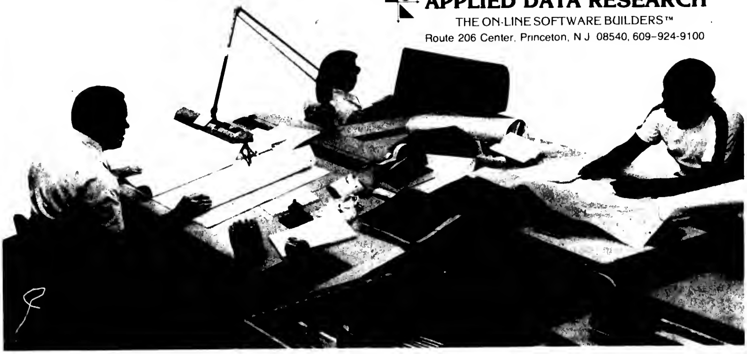
"Now we are executing over 45 programs under RTS covering every aspect of highway engineering. We are saving engineer's time and getting better studies."

"Under batch, there was usually a day's delay before all calculations were checked and the run made," added Staff Engineer, Bryce Clodfelter. "With RTS, we go from rough notes directly to terminal input. The run is completed in seconds. And if a mistake is made, we can correct it on-the-spot."

"We're doing a lot of work in four hours that would have taken a week before," emphasized Engineer Wayne Robey. "That's not just the calculations—that's the complete job."

RTS, ROSCOE's new VS time-sharing facility, brings interactive personal computing to people who need to solve problems quickly, without the complexities of conventional data processing. It's a facility for solving business, statistical, engineering, and scientific problems—a simple way to share your computer with people who might otherwise need their own outside time-sharing service. In addition, ROSCOE's comprehensive preparation, testing, and maintenance facilities expedite the development of programs destined to run under RTS.

APPLIED DATA RESEARCH
THE ON-LINE SOFTWARE BUILDERS™
Route 206 Center, Princeton, N J 08540, 609–924-9100



Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

ADR software products: In use at over 8000 installations worldwide. U.S. offices in Atlanta (404) 252-9130, Boston (817) 245 9540, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011 **International offices** in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.

V12-14 APR 3 78 UMI

Congressional Unit to Ponder 'Official' DP Use

(Continued from Page 1)

of issues and barraged by sophisticated mass mailing techniques, particularly by the far left and right, congressmen can put automation to good use in keeping up with the task of representing their districts. Computer systems and services can help generate return mail, tell the congressmen's constituents the federal grants for which their towns and counties qualify, track bills and legislation and find out what's happening on the House floor.

Computer systems and services can also build a data bank of the names, addresses, occupations and political views of taxpayers who write to their congressmen. And, at election time, a congressman's campaign committee need only spend a few hundred dollars to extract mailing lists of constituents broken down by county, by occupation, by viewpoint on a particular issue or by any other category the system has been programmed to track.

There is nothing illegal about this double use of congressional systems. The Federal Election Commission (FEC) said in a 1976 opinion that it is permissible for congressmen to use campaign funds to extract information from their office computers.

But there is doubt inside and outside Congress whether some members' easy, inexpensive access to such computerized information is fair to their campaign opponents. There is fear that it could get overpowering.

Amendments Introduced

One of the most advanced computer users in the House, with his own mini tucked away in an office closet, Rep. David Stockman (D-Mich.) is sufficiently concerned that he recently introduced two amendments to the Campaign Reform Act to alleviate the potential for misuse.

The Campaign Reform Act was not permitted to reach the House floor just over a week ago, but will be brought up again, a spokesman said.

One of Stockman's amendments would dictate that mailing lists compiled in campaigns at campaign expense can't be used by representatives for office business. The other amendment would not permit computerized, mailing lists generated at taxpayer expense to be used for anything other than "official" purposes, a spokesman for the congressman said.

Stockman withdrew this second amendment from the Elections Act in favor of a final decision on the matter by the House Administration Committee.

The problem facing the committee will be the definition of "official," the spokesman for the policy group said. A change to the rules governing the members of Congress along the lines suggested by Stockman's amendment will be the goal of the next meeting, he stated.

The House, with some members far ahead of the Senate in computerization, will have more trouble policing its members than will the other half of Congress, congressional sources agreed. Unlike members of the House, Senators aren't permitted to lease computer services from private vendors. All their terminals are linked to the Senate system, which has rules about its use for clearly political purposes.

On the House side, however, FEC campaign finance reports show that several congressmen's political campaign committees buy computer services from the firms that sell their abilities to the congressmen's offices.

Some recent news reports have pointed out the belief of congressional sources that some legislators use computers for campaign purposes but never charge anything to their campaign committees. The activity, therefore, does not show up in FEC records.

Jeffords' Case

When questioned about the use of his office computer for campaign reasons, Rep. James Jeffords (R-Vt.) said, "If I had been dishonest, I could have had the mailing labels run off quietly, at pubic expense, and nobody would have ever noticed."

Public records indicate Jeffords took $3,111 from his congressional allowance during the first six months of 1976 to purchase computer services from Wang Laboratories, Inc. In July of that year, the Jeffords for Congress Committee paid $200 to the same company for two sets of mailing labels with the name and address of every Vermont resident who wrote to Jeffords during his first 18 months in office.

"There is no question the opportunity for abuse exists," Jeffords said. "Like many other aspects of a congressional office, computer [services] could be used for blatantly political purposes by an unscrupulous member of Congress."

Other congressman who have employed their office computer services for campaign purposes include Rep. Phil Sharp (D-Ind.), who paid $9,000 to Computer Data Services, Inc. in the 10 months before the November 1976 election and whose campaign committee paid $341 to the same firm for mailing labels; Rep. James Blanchard (D-Mich.), who took $2,370 from his allowance during the first six months of 1977 to buy time from Dialcom, Inc. and whose campaign committee spent $472 with the same company last June for computer services; and Rep. Floyd Fithian (D-Ind.), who paid $4,923 from his allowance to Digital Management Corp. for services in 1976 and whose 1976 campaign committee, the Friends of Floyd Fithian, received a mailing list from the same firm in return for $153.

One suggestion made to curb potential excesses is to control the amount of franked mail that members of Congress can send. But many congressmen object that they need the computer and the franking privilege to keep up with the demands of their job.

Rather than limit congressional privileges, Congress shoud give some financial help to political opponents, according to Rep. David Obey (D-Wis.).

A section in the Campaign Reform Act promises public financing for opponents of particularly entrenched incumbents. As a result of a recent Houses Rules Committee meeting, however, public financing will be removed from the version of the bill that finally goes to the House floor, a congressional spokesman said.

IBM 5100 & 5110 USERS
-TAKE NOTE

Give your IBM 5100 tape and IBM 5110 tape or disc mini-computers greater capability with the Tradestreet financial simulation model. Especially designed for these IBM mini-computers, it is also compatible with the amazing MCM-800 mini-computer or through Time Sharing.

Tradestreet's completely interactive and error protected model is invaluable for financial forecasting and for proformas in merger and acquisition situations. Further capabilities include detailed investment analysis, pricing strategy, sale of divisions, or the effect of anticipated changes in external conditions.

Other 5100, 5110 and MCM packages include: report generator; management reporting; weekly cash flow reporting; weekly SKU reporting of production, shipping, bookings.
Call Dan Enright at 704-376-2736 for further details.

TRADESTREET
RESEARCH
Suite 3570 One NCNB Plaza Charlotte, North Carolina 28280

Analysts' Gain Biggest

(Continued from Page 1)

firm reported.

Starting salaries for the industry as a whole, meanwhile, increased 6.3% over 1977 figures, according to the analysis.

The study also indicated that large companies usually pay higher starting salaries than medium and small companies but that medium and small firms often have more rapid advancement for selected employees.

Half also pointed out that medium and small firms requiring experience with large systems must pay competitive salaries with the large users.

Installation size is determined on an individual basis for each company and is based primarily on the size of the DP staff, a spokesman explained. If the installation includes a DP manager, it is placed in the medium or large category. An installation is "large" if it hires a manager, programmers and systems analysts, the spokesman said.

The study showed that a computer operator in a large installation can expect a starting salary of $10,500 to $14,000 (a 2.1% increase from 1977). An operator in a medium installation may earn between $10,500 and $14,000 (an 8.9% change) and an operator in a small installation may earn from $9,000 to $12,500 (a 4.9% increase), Half said.

A programmer with up to one year experience can start at $12,000 to $14,500 in a large installation, a figure unchanged from last year, according to the study. In a medium installation, the programmer may earn between $12,500 and $13,500 (up 4%) and the new programmer in a small installation can earn from $10,000 to $13,000 (up 2.2%).

For programmer analysts, increases were larger. A programmer analyst in a large installation can earn between $16,000 and $22,000 (a 5.6% rise in starting salary from the year before). In a medium installation, a programmer analyst can earn from $15,500 to $20,000 (a 4.4% increase) and a programmer analyst in a small installation can earn between $13,500 and $16,500 (a 5.3% increase), Half said.

According to the study, lead programmers in large installations are doing still better. A lead programmer can start at $18,000 to $22,000 annually, 8.1% more than in 1977. In medium-sized installations, starting salaries were found to be between $17,500 and $20,000, or 4.2% more. Lead programmers were not found very frequently in small installations.

A project manager in a large installation can expect to earn between $21,000 and $26,000 — a 4.4% increase from 1977. In a medium-sized installation, the same position pays between $19,500 and $23,000 — a 6.3% increase — and again the project manager position was not filled in the small installation category, the survey noted.

A director of DP in a large installation can expect to earn between $26,000 and $40,000 — a 1.5% increase. A DP director in a medium installation can earn between $23,000 and $28,000 — an 8.5% increase, and a DP manager in a small installation can earn from $19,000 to $25,000 — a 10% increase, the survey reported.

All of the salary figures cited represented a national average and salaries would probably be 15% to 20% lower in the Midwest and 10% higher in New York, the spokesman claimed.

In World Cup Competition

Mini Tallies Skiers' Standings

By Tim Scannell
CW Staff

AROSA, Switzerland – The World Cup Skiing Competition, a grueling contest that spans three months and is held in five countries, recently ended here for both the contestants and a participating minicomputer.

During the competition, which began in late December, an Olivetti Corp. P6060 was used to keep track of the final times in each trial, calculate the marks and supply a final general classification among the skiers, a spokesman stated.

The P6060 was programmed to operate in each phase of the ski tour, or "white circus," as participants call the competition. In all, there are 23 events for both men and women consisting of a series of downhill races, slaloms and giant slaloms as well as a final head-to-head parallel race, the spokesman explained.

Timekeepers used the Olivetti machine to record skier's times, down to the hundredth of a second, and process each one's standings according to the latest results. Times and standings were printed by an integrated printer and also stored automatically on a resident floppy disk, the spokesman continued.

The minicomputer was also linked to the various television networks filming the events to provide accurate and up-to-the-minute results to them as they broadcast the World Cup activities, the spokesman added.

Overall winners in the competition were Ingemar Stenmark of Sweden in the men's division, who captured a win for the third season in a row, and Hanni Wenzel of Liechtenstein in the women's.

Two World Cups, or Trophie Avions, are awarded each year, one to a man and one to a woman, on the basis of points accrued in the 23 events. Skiers are given 25 points for a first place finish, 20 for a second, 15 for a third, 11 for a fourth and so on down to one point for a 10th place, the spokesman continued. Standings are computed by adding the skier's three best results in each category of competition.

Shaggy Dog Story?

WASHINGTON, D.C. – Walter Greenberg became dog-tired of receiving junk mail and sales calls after his name was mysteriously placed in a computerized data bank.

In fact, Walter started going around the house with a hang-dog look on his face – something not really unusual since Walter is a member of that species commonly referred to as "man's best friend."

When solicitors inquire for Walter, his family usually responds that "he's tied up." But one offer was too good to miss, Daniel Greenberg, Walter's owner, said in a recent *Washington Post* article.

The publishers of an annual directory of distinguished Americans selected Walter as an entry for the next edition. The family filled out the forms listing Walter's occupation as dog breeder and are now eagerly awaiting their volume.

IBM Brings Out 3033 MP Unit

(Continued from Page 1)

tions" of the MP workload during off-peak hours and while the other CPU is out of service. In addition the two processors can function as independent systems.

The MP configuration does provide some operating benefits, such as needing only a single system control program that can be shared and reduces storage overhead, the spokesman pointed out.

Despite these operating advantages, the 3033 MP provides no features not previously available on a single 3033, he said.

The System/370 Extended Facility, which is supported and used by IBM's MVS/Systems Extensions program product, is standard on the 3033 MP. This software offers increased performance by simplifying certain control programming tasks, IBM said.

Programs that operate on a single 3033 also will run on the MP CPUs when they are run as individual systems.

Single-processor 3033 systems can be upgraded to MP configurations at the user's site, IBM said.

Under terms of a 48-month Term Lease Plan (TLP) contract, a 3033 MP including two CPUs with a shared main memory of 8 million characters, a 3038 communications unit, two consoles and two power and cooling units can be leased for $154,130/mo. Under the same terms, an MP system with the maximum memory capacity of 16 million characters can be leased for $182,130.

These configurations also are available for a monthly rental charge of $169,520 and $200,280, respectively, or can be purchased for $7,160,000 and $8,050,000.

The MP system on a monthly rental basis costs $14,660 more than two comparable systems. On a TLP lease, it costs $13,330 more, IBM said.

Customer shipments of the 3033 multiprocessor are scheduled to begin in the third quarter of 1979.

7 reasons why you will benefit from DYNAM/D

reasons that make it the fastest selling Disk Space and Catalog Management System in the World.

DYNAM/D solves the most vexing and time-consuming design deficiencies of IBM 360/370 DOS and DOS/VS systems.

Here are just 7 reasons for testing DYNAM/D in your installation:

1
Automatic Disk Space Allocation
full recovery capabilities when the file is opened, not before the job is initiated.

2
Catalog Management
lets you control the physical attributes of the disk file separately from job control.

3
Total File Security
assured by matching password that prevents both accidental erasure and unauthorized access to confidential data.

4
Device Independence
makes it easy to add new DASD devices without modifying existing programs.

5
Utility Programs
provide file maintenance facilities along with detailed reports on disk space usage.

6
Automatic Secondary Allocation
provides additional disk space if the original extent is used up.

7
DYNAM/D is from Computer Associates
(the CA-SORT people) with a world-wide network of offices to serve you.

Take a few minutes right now to send for the **FREE** Information Kit and details of a no-cost 15-day trial installation of DYNAM/D.

These benefits and more can soon be yours!

MAIL THE COUPON OR CALL TOLL-FREE
800-221-4767
[NY State Call: 212-355-3333]

Member Software Industry Association

COMPUTER ASSOCIATES
655 MADISON AVENUE
NEW YORK, NY 10021

U.S. OFFICES:
New York, California, Connecticut, Georgia, Illinois, Missouri, Ohio, Texas, Virginia

WORLD-WIDE DISTRIBUTION:
Australia, Austria, Argentina, Benelux, Brazil, Carribbean, Chile, Columbia, France, Germany, Holland, Indonesia, Israel, Italy, Japan, Mexico, Philippines, Scandanavia, South Africa, Spain, Southeast Asia, Switzerland, United Kingdom, Venezuela

☐ **YES!** Please rush the free DYNAM/D Information Kit! cw4/3/78

Name ____
Title ____
Company ____
____
Address ____
City ____ State ____ Zip ____
Phone No. (____) ____-____ CPU ____ OP/SYS ____

White House Shopping for Computing Power

(Continued from Page 1)

The system EOP eventually winds up with will replace an IBM 370/155 and could be based on another large central system, multiple minicomputers or some form of distributed processing, Calo said. He has had conversations with more than 40 interested vendors.

In addition to providing as many as 100 specific EOP applications, electronic mail and word processing, the ultimate EOP information system must include a data base management system (DBMS) capability and must be able to access the outside world, whether that world is composed of commercial data bases or congressional or federal agency systems and networks, Calo stated.

The White House DP head wants constructive comments from industry, hence the preliminary specifications. A formal request for proposal will be sent out in July, with a target delivery date for the system of December. "It will be a Christmas present for the President and his office," Calo chuckled.

Communication Lacking

That Christmas present will represent something of a revolution in information handling and data processing in the EOP. The President's reorganization project most recently identified a persistent lack of communication between the advisory units at the top of the executive branch.

In its report to Carter last June, the reorganization team pointed to the lack of coordination that resulted in "no common inventory of languages, application systems, equipment, staff or available expertise." The Reorganization Plan No. 1 of 1977 accordingly recommended that there be "one place within EOP to get computer applications developed and to obtain consultation and advice."

The reorganization project suggested further that a central administrative support unit be set up to integrate and coordinate the computer operations of the 12 separate EOP offices.

The Office of Administration was created when Congress gave the go-ahead to the reorganization plan last October. That go-ahead represented Congress' official approval of activity under way since June to do something about the information and communications problems in the EOP, according to Richard Harden, now director of the Office of Administration and the President's special assistant for information management. Harden has a staff of 150 and a budget of $8 million.

Outside Data Bases

While the primary computer operation and all control will reside with Calo and his internal staff of 50 systems analysts and programmers and 50 outside individuals, the information system will rely on and benefit from a number of outside data bases and networks, according to Edward K. Zimmerman, special assistant to Harden and the person in charge of long-range vision for the system. Twenty data bases are available to the EOP now.

"Except for the Office of Management and Budget's budget preparation, there is no need for a huge central computer center to serve the White House," Zimmerman said. "We will stress communication rather than computation."

The White House continues to have access to the congressional bill tracking system, known as Legis, the Justice Department's legal search system — Juris — and such commercial data bases as the New York Times Information Bank.

Eventually, the EOP hopes the flow of information from Capitol Hill may be returned in the form of better budget data for Congress and better statistical data on how the federal government actually spends taxpayer dollars — "After all, Pennsylvania Avenue is a two-way street," Zimmerman pointed out.

erisa event reportable?

An employer who knows, or should know, of any of eight ERISA reportable events, must immediately notify the plan administrator, who must notify PBGC within 30 days.

If your benefit management system cannot provide you with early warning of any of these events, Joe Nestor (617)851-4111, Wang Laboratories, Inc., Lowell, MA. 01851 can tell you about a new Wang software system for 360/370, Univac and Burroughs that can. . .

WANG

Bureau Leaves Flood Path

(Continued from Page 1)

But "we were prepared for the eventuality beforehand. We rented and had standing by two large moving vans and two other covered trucks. About 10 o'clock that morning I had made a decision to add another truck just to make sure we had enough because there were a lot of people being flooded out," he recalled. "Police helicopters, circling overhead, notified us when it was time to evacuate the building.

"With the help of our 35 employees and three willing and helpful hardware vendors, we loaded up our IBM 360/40 system and peripherals and headed for high ground," Hagan said.

The three trucks and two vans, containing the bulk of ADP's equipment, were parked in a lot beside the bank. "Everything was under lock and key, under guard, in the guarded parking lot," Hagan said.

Hagan then set up two "command centers" to coordinate his company's activities. ADP's customer service people worked out of the bank's operation center and "our payroll manager set up the second command center at his house to keep track of our employees and the flood situation," he said.

The flooded river crested out at one o'clock in the morning on March 3, just short of the industrial park site. "We actually received no flood damage whatsoever to the building," Hagan said. "There was water in the street just a few hundred feet from us and the utility company had powered off the entire industrial park area because the flood was taking out a lot of the power poles."

Things could have been much worse, he remarked. If all five dams had ruptured at once, Hagan was informed, the City of Phoenix would have been under 12 feet of water.

Nevertheless, flood waters were still high enough to make all of the 20-plus causeways that traverse the Salt River bed impassable to regular traffic.

After the danger had passed, Hagan put into motion a plan to get his center back into operation. The equipment-filled trucks were driven back to the industrial center, the computers were unloaded and "by seven that evening we were back in business at our permanent location."

Not a single record or storage tape was lost or damaged before, during or after the evacuation — a fact especially notable, Hagan pointed out, because the ADP center itself had been established only three weeks prior to the crisis and the entire evacuation procedure had been improvised.

"This is a brand new office," Hagan observed. "We never had time to develop any type of standard backup plan — I just called the shots as I saw them."

FOR LEASE
3031
JULY, 1978 DELIVERY
OUR POSITION
CERTIFIED FOR LEASE
CALL RAY HOMA

COMPUTER EXCHANGE/
NORTH AMERICA CORPORATION
302 Technology Park, Suite 101
Norcross, Georgia 30092
(404) 449-4400 or (800) 241-4311

In Handling People Problems

Be Aware of Changing Attitudes, Attendees Told

By Don Leavitt
CW Staff

SAN FRANCISCO — Every single person is a unique configuration of talents, capabilities and attitudes and the "configuration" may change from day to day in the face of both internal and external factors.

That is why the management of people is such a complex function, according to management consultant Ira Gottfreid, who told a Computer Expo '78 audience here last week that "people problems" are "tough to diagnose and even tougher to fix."

But recognizing problems "before they explode" and handling them when they occur should leave the good manager with more time to do the real work of the organization for whom he works, the consultant said.

The process must start, Gottfried noted, with the manager's recognition of his own, perhaps limited, viewpoint. "Do you, for example, have the same view of life you had when you started in business? Have you ever taken time to think about life? What are your goals?" he asked, adding that if a manager doesn't have goals, it's unfair to expect his employees to have any.

Probing Introspection

But the manager has to be more probing in his introspection, Gottfried continued. "Ask yourself, honestly, are you open to ideas from others? Are you willing to train your subordinates to do your job? Are you, in fact, a 'management snob' remembering that 'rank has its privileges' and, for example, always using your office for meetings? When was the last time you went to a subordinate's work area to talk over a problem?

"When was the last time you stood back and measured your strengths and weaknesses as a people management?" he persisted, "And when did you last recognize that you are *dependent* on those who work for you?"

But even the manager who has analyzed his or her own "configuration" may have trouble relating to today's new employees, Gottfried warned. "They are different than we were, even five years ago."

Early DPers came out of other departments of a company and knew the company's reason for being. Newer technicians are coming from school and they know technical details but not much about business life, he said.

Beyond that, he reminded his audience, the new employees in particular are products of the upheavals of the 1960s. They are not prepared to be patient with the way things are. They are extremely conscious of employee rights.

The Human Connection

The tend to put their own interests first. After that, DPers especially tend to rank their profession second and their company's interests third.

"If you don't believe that, try a little test. Ask a DPer where he works: The answer will be in data processing. Ask an accountant or a bank teller or a welder the same question and the answer will be at XYZ company."

DPers tend to see others in their own companies as "them," Gottfried said. And with their self-interest, job content and career planning are more important than they once were. "Overtime is no longer a way of life. Outside interest and concerns — shared family responsibilities, for example — have their priorities."

Managers must be salesmen; they cannot be insensitive to the makeup of their employees, he said.

Those differences make it tougher to be a manager, but the person who can cope with the changes is a better manager because of them.

MIT to Offer Systems Course In Mid-June

CAMBRIDGE, Mass. — The Center for Information Systems Research at MIT has announced this summer's seminar.

The seminar, offered every year, will concentrate this year on research and practice aimed at improving the effectiveness of information processing tools and techniques in different types of organizational settings. Other topics to be discussed include problem diagnosis, data base management systems, distributed processing, research on end-user need assessment and decision support systems, according to a spokesman.

The seminar, which is scheduled for June 19-23 on the MIT campus, is said to be especially relevant for managers with responsibility for designing, implementing and evaluating application systems. Tuition is $750, with announcements available from the center at 50 Memorial Drive, Cambridge, Mass. 02139.

OPTIMIZER III
Eliminates program problems before it's too late.

From Capex, a dramatic new approach to COBOL programming.

Programs that apparently have been thoroughly tested sometimes fail... unpredictably and unexpectedly. And for most programs, there is never a "good" time to fail.

That's where Capex can help, with an exciting new program product we call OPTIMIZER III. If you use COBOL and any of the IBM OS, VS1, SVS or MVS operating systems, OPTIMIZER III can help you produce more reliable, more efficient systems, on time, at lower cost.

Improves Program Reliability

OPTIMIZER III works directly with each COBOL programmer, providing direct feedback about what the program *actually* does. Concise, easy-to-use information is provided right on the source program listing to help spot otherwise hidden logic or performance problems and to highlight untested logic. Using OPTIMIZER III, problems are found and corrected *before* programs go into production so there are fewer failures, fewer missed production schedules, fewer reruns.

Speeds Problem Diagnosis

OPTIMIZER III helps minimize the impact of program failures. It "traps" program failures, analyzes them, and then provides the information needed to diagnose the problem. Whether programs are in development or in production, problems can be diagnosed quickly, directly by COBOL programmers, using OPTIMIZER III's COBOL-oriented diagnostic information instead of cryptic hexadecimal dumps. Problems are corrected faster, lost time is minimized, and reliance on special support groups is reduced.

Better Programs Faster

By providing key information in a highly usable form, new OPTIMIZER III works with each COBOL programmer to produce more reliable, more efficient programs. It provides the information needed to speed program debugging and ensure adequate testing. Programs are developed faster, with fewer compiles, fewer test shots. Printed output for listings, dumps is reduced And, thanks to proven automatic object program optimization, all programs produced with OPTIMIZER III are smaller and faster, *automatically*.

Results Available Immediately

With OPTIMIZER III, you get better program quality, more programming capacity, more system capacity And you get them *immediately* Without changing systems. Without costly retraining. Without increasing cost. You can have new OPTIMIZER III working for you literally in a matter of minutes. To find out how, write or call now. (602) 264-7241

CAPEX CORPORATION
Atlanta (404) 261-3553 • Boston (617) 329-6170 • Chicago (312) 596-6550 • Dallas (214) 238-7191 • Los Angeles (213) 923-9216 • New York (201) 262-6888 • Other offices worldwide

capex CORPORATION

Capex Corporation
2613 N 3rd St Phoenix AZ 85004

Gentlemen
Please send me more information on OPTIMIZER III

Name
Title
Company
Address
City
State Zip
Phone
Model
System ☐MFT ☐MVT ☐VS1 ☐SVS ☐MVS

CE

DPers Get Hearing Date With California Tax Board

SACRAMENTO, Calif. — The Sales Tax Action Group (Stag) of California has arranged a day-long public hearing before the California State Board of Equalization on May 4 at 10 a.m. in Room 102, 1020 N St. here.

The hearing will deal with the Board of Equalization Regulation 1502, which dictates the taxation of software and services, a spokesman said.

Stag is an unincorporated association of representatives from approximately 150 DP companies based in or with business activities in California. The present purposes of the organization are to question and contest both the validity of the provisions of Regulation 1502 and the propriety of the enforcement of those provisions.

He said it is the position of Stag that the Board of Equalization:

- Does not fully understand the workings of the DP industry and therefore is not in a position to impose equitable sales and use taxes on the industry.
- Unfairly treats advisory services in the DP industry as fabrication labor so as to include the value of those services in the measure of sales and use tax of any incidental tangible by-product of those services.
- Improperly taxes intangible computer programs through contrived logic.
- Is inconsistent in its application of the provisions of Regulation 1502 to particular situations, resulting in selective, discriminatory and inequitable taxation.

Call for Papers

SYMPOSIUM IFAC/IFORS. COMPARISON OF AUTOMATICS AND OPERATION RESEARCH TECHNIQUES APPLIED TO LARGE SYSTEMS ANALYSIS AND CONTROL, Toulousa France, March 1979

Topics in the area of methodology and general tools include decomposition and coordination, decentralization and hierarchization, data analysis in process control, modeling, simulation techniques and specialized languages and diagnosis and correction of failure modes. In the area of actual applications, topics include production control, transportation network management and control, communications network control and economical system managsment and control

Submit five copies of a two-page summary in English and French by April 15 to M. Pelegrin, Comite du Programme du Symposium, Cert — B.P. 4025, 31055 Toulouse Cedex, France

MUMPS USERS GROUPS, San Francisco, Calif., June 7-9, 1978

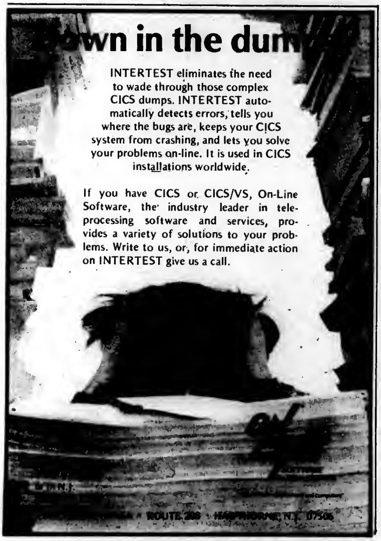
Tutorials include beginning and intermediate programming, Mumps for managers, converting to standard Mumps and Costar. Two-star panels on portability and data base management systems are planned.

One-page abstracts may be sent until April 17 to Pat Zimmerman, University Hospitals, Department of Biometry, Cleveland, Ohio 44106.

1978 FALL INDUSTRIAL ENGINEERING CONFERENCE, Atlanta, Dec 4-6, 1978

Topics include conservation, engineering economy, banking, office automation, work measurement, ergonomics and distributive computer processing.

Send two copies of an abstract no longer than 500 words by June 15 to 1978 Fall Industrial Engineering Conference, Conference Department, American Institute of Industrial Engineers, Inc., 25 Technology Park/Atlanta, Norcross, Ga. 30092.



INTERTEST eliminates the need to wade through those complex CICS dumps. INTERTEST automatically detects errors, tells you where the bugs are, keeps your CICS system from crashing, and lets you solve your problems on-line. It is used in CICS installations worldwide.

If you have CICS or CICS/VS, On-Line Software, the industry leader in teleprocessing software and services, provides a variety of solutions to your problems. Write to us, or, for immediate action on INTERTEST give us a call.

Calendar

May 1-2, Boston — **Pro-Test Users Group Conference,** sponsored by Synergetics Corp. Contact: Alexander R. DeVito, President Synergetics, One DeAngelo Drive, Bedford, Mass. 01730.

May 1, Anaheim, Calif. — **Microprocessor Project Management,** sponsored by Integrated Computer Systems, Inc. (CICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

May 2, Anaheim, Calif.— **Microprocessors and Microcomputers: A Comprehensive Technical Introduction and Survey,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

May 2, Mobile, Ala. — **Data Processing Management Association/Association for Computing Machinery (DPMA/ACM) Joint Area Seminar and Trade Show.** Contact: Cheryl McNeil, Seminar Coordinator, Mobile County Data Processing, P.O. Box 1443, Mobile, Ala. 36601.

May 2-5, Los Angeles — **Distributed Processing and Computer Networks,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held May 9-12 in Washington, D.C., June 13-16 in Toronto, June 20-23 in Boston and July 11-14 in Aspen, Colo.

May 2-5, Los Angeles — **Modern Methods of Digital Signal Processing,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held May 9-12 in Washington, D.C., June 6-9 in Toronto and June 20-23 in Boston.

May 2-3, Boston — **Seminar on Zero Base Budgeting,** sponsored by Advanced Management Research (AMR). Contact: AMR International, Inc., 1370 Ave. of the Americas, New York, N.Y. 10019.

May 3-5, Anaheim, Calif. — **Hands-On Microcomputer Programming and Interfacing Workshop,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

May 3-5, St. Charles, Ill. — **Successful Project Management of Micro and Minicomputer Systems,** sponsored by National Engineering Consortium, Inc. Contact: National Engineering Consortium, 1211 W. 22nd St., Oak Brook, Ill. 60521.

May 3-5, St. Charles, Ill. — **Microcomputer Architecture Interfaces, Testing, Reliability and System Design,** sponsored by National Engineering Consortium, Inc. Contact: National Engineering Consortium, 1211 W. 22nd St., Oak Brook, Ill. 60521.

May 5-6, Rocklin, Calif. — **Northern California Community College Computing Consortium NC 5 Spring Conference.** Contact: Perry Edwards, Sierra College, 5000 Rocklin Road, Rocklin, Calif. 95677.

May 6, Poughkeepsie, N.Y. — **Teaching Computing in Two- and Four-Year Colleges,** sponsored by the College Interest Group of the New York State Association for Educational Data Systems. Contact: Prof. Robert Melter, Southampton College, Southampton, N.Y. 11968.

May 8-9, New York — **Conference on Data Communications,** sponsored by the American Institute of Industrial Engineerings (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

May 8-10, Atlanta — **Forum/5 Spring Conference,** sponsored by Forum International. Contact: Forum International, 4902 Tollview Drive, Rolling Meadows, Ill. 60008.

May 8-10, New York — **Computer Data Security Using Commercial Cryptographic Technology.** Contact: Charlene Woolard, Ketron, No.10 Valley Forge Executive Mall, 530 E. Swedesford Road, Wayne, Pa. 19087. Also being held May 22-24 in Washington, D.C.

May 8-10, Los Angeles — **Data Processing Management: 1978,** sponsored by American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held Sept. 20-22 in Chicago and Nov. 15-17 in New York.

May 8-10, New York — **How To Protect Your Computer Data From Theft,** sponsored by Ketron, Inc. Contact: Ketron, No. 10 Valley Forge Executive Mall, 530 E. Swedesford Road, Wayne, Pa. 19087. Also being held May 22-24 in Washington, D.C., June 18-20, Barcelona, Spain, and July 24-26 in Denver.

May 8-10, Palo Alto, Calif. — **Digital Modulation and Coding,** sponsored by Martin E. Hellman Associates. Contact: Hellman Associates, 730 Alvarado Court, Stanford, Calif. 94305.

May 8-10, Chicago — **32nd Annual Technical Conference of the American Society for Quality Control (ASQC).** Contact: Darlene C. Schmidt, ASQC, 161 W. Wisconsin Ave., Milwaukee, Wis. 53203.

May 8-11, Chicago — **Structured Design and Programming Workshop,** sponsored by QED Information Sciences, Inc. Contact: Marlies Stueart, QED Information Sciences, 141 Linden St., Wellesley, Mass. 02181. Also being held May 22-25 in Washington, D.C. and June 19-22 in Toronto.

May 9-10, Dayton, Ohio — **Computer/Terminal Farm** sponsored by the University of Dayton Office for Computing Activities. Contact: Ronald L. McAdams, University of Dayton, Office for Computing Activities, Dayton, Ohio 45469.

May 9-11, Uxbridge, England — **Eurocomp 78,** sponsored by Online Conferences Ltd. Contact: Online Conferences, Cleveland Road, Uxbridge, England UB8 2DD.

May 9-12, Atlanta — **Third International Conference on Software Engineering,** sponsored by the Institute of Electrical and Electronics Engineers, Association for Computing Machinery, and the National Bureau of Standards. Contact: Software Engineering, P.O. Box 639, Silver Spring, Md. 20901.

May 9-12, Wellesley, Mass. — **Leadership — Managing and Motivating DP People,** sponsored by Babson College and QED Information Sciences, Inc. Contact: Phyllis Tibbetts, Continuing Management Education, Babson College, Wellesley, Mass. 02157.

May 9-12, Boston — **1978 National Micrographics Association (NMA) Exposition.** Contact: NMA, 8728 Colesville Road, Silver Spring, Md. 20910.

Expo Speaker Stresses Involvement

Managers Called Crucial to DPer's Career Plans

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — Managers of DP personnel must become deeply involved in charting their subordinates' career paths if they want to help staffers realize their full occupational potential and avoid on-the-job dissatisfaction, according to Robert Showalter, an information technologist with Lockheed-California Co.

Showalter made his remarks as one of the speakers at a workshop entitled "Managing People Problems," held here during the first of this year's series of traveling Computer Expo '78 conferences.

Speaking on the subject of career pathing, Showalter outlined a series of general steps for corporate managers to take when helping their staff members plan professional futures.

Executives should first outline for their employees the management structure of the company and the structure of the computer profession as a whole. Some companies offer more avenues for advancement as DP professionals than others,. and managers should not try to conceal any shortcomings in a firm's career opportunities from subordinates, Showalter said.

If an executive tries to placate a discontented employee by encouraging the individual to pursue a nonexistent career path, he will only heighten the staffer's dissatisfaction, the information technologist added.

Second, managers must help staff members establish realistic career goals. In this regard, executives can prove particularly helpful to an employee because they frequently see limitations in an employee that the employee cannot see, Showalter explained.

Managers should then analyze each employee's job skills and determine whether the person has the qualifications to achieve his carrer goals, the Lockheed California executive continued.

In the next step, managers should develop a preliminary timetable for employee advancement and establish a method for evaluating that progress at regular intervals, Showalter said.

Traumatic Regression

Finally, managers must be willing to work closely with their staff when, as sometimes happens, their career planning efforts go awry, he explained. In fact, at times managers must start again at the first step and help disaffected employees radically rechart their career courses.

"You must remember regressing to square one is sometimes very traumatic experience, both for the person and his supervisor or manager," Showalter advised his listeners. "But it's often the only way to get things back on track."

If DP personnel fail to progress in their chosen fields and become apathetic in their jobs, their managers should bear at least part of the blame, he said.

To try to prevent this waste of corporate manpower from occurring at Lockheed California, Showalter and his colleagues provide resources to help talented and ambitious DP personnel advance, he said.

The company offers in-house instruction that helps employees perfect current skills and acquire the skills they will need in their next jobs.

"Training to expand the horizons of those who have chosen to remain at the senior programmer/analyst level is a continuing process," he explained. "This training is largely conducted during working hours."

The company also offers a broad range of compensation for DP specialists who wish to remain in their current positions. This policy allows the truly talented specialists to be rewarded for superior performance, Showalter said.

The Human Connection

Elaborating on Lockheed-California's personnel management philosophy and techniques, Showalter described some of the career paths open to DP professionals in his organization.

Computer operators at the company can advance into the support group, which prepares production runs for execution, or into the firm's JCL documentation group. In fact, most of the personnel in these two groups started as operators, where they gained the knowledge of operating systems, JCL and scheduling necessary for advancement, Showalter noted.

Also, computer operators at the company can move into programming or software services or become staff specialists. Movement into these positions, however, requires professional preparation, most of which the candidates must initiate themselves and obtain in their spare time, he said.

Programmers, meanwhile, can advance into software services or the integrated data base (IDB) function or become senior programmers/analysts, project leaders, staff specialists, IDB specialists or even managers, Showalter added.

Programmers . . .
Teach yourself assembler language

During the last few years, we have sold thousands of our System/360-370 assembler language books to DP professionals. There are two versions of this book — one for DOS, one for OS — and both books are sold with this unique guarantee. If you can't learn assembler language from these books, you can return them for a full refund no matter how long you've had them.

Now, the results speak for themselves. Less than three percent of the buyers have returned our texts. And dozens have taken the time to write letters of praise.

Once you finish one of our assembler language texts, you will have several new skills. You will be able to debug using storage dumps ... regardless of the language you're using. You will be able to write and use BAL subprograms. You will be able to maintain and develop complete assembler language programs . . . even ones that process ISAM and direct files.

In addition, you will have a deeper understanding of what actually happens as one of your programs executes. As a result, you will be more independent, more in control of your system.

4 Reasons Why Our Books Are Effective

1) These books were written by an expert from industry, Kevin McQuillen. He's been a DP manager, consultant, and manufacturer's rep, so his books are chock-full of solid, practical, real-world advice.

2) The content of these books is based on an analysis of the tasks normally required of an applications programmer. That's why these books contain everything of use to the average programmer, and very little that isn't. That's also why these books give substantial coverage to job-control language. The DOS book covers DOS and DOS/VS. The OS book covers MFT, MVT, VS1, and VS2.

"Got your assembler language text yesterday and stayed up half the night reading it. The book is great."

Programmer
East Hartford, Conn.

3) These books are organized by function. A complete subset of BAL is presented in the first three chapters of the book, and later chapters cover such functions as debugging, table handling, subprogram linkage, and file handling. When material is organized in this way, you learn more quickly because you always see purpose.

4) Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve direct files. In between there are listings for routines and programs that perform code translations and input validations, set up the linkage between mainline modules and subprograms, load and use tables in storage, create and retrieve sequential and ISAM files, and so on. As a result, you will have many models of professional coding techniques upon which to build.

"As I read through the book and began formulating questions, I found that every question was answered shortly afterwards. I have never felt so comfortable with a subject that has always made me a little uneasy."

Programmer
Indianapolis, Ind.

Content

The intent of these books is to develop a basic programming skill in assembler language. As a result, the initial emphasis of each book is on a professional subset of BAL along with the related debugging skills. If you did nothing more than master this material (chapters 1-5), I think you would justify the cost of the book several times over.

Beyond this, table handling, subroutine and subprogram linkage, and sequential and ISAM file handling are given primary emphasis. Since these are common programming functions, this material is valuable background regardless of the language you normally use.

"Your book has been a tremendous help to me. I would recommend it to anyone."

Systems Analyst
Omaha, Nebraska

Finally, these books show you how to write macro definitions (great background for working with software packages), how to code bit manipulation and translation routines, how to isolate the fields in free-form input data (a common function in teleprocessing programs), and how to work with direct files. This type of material starts you on your way to the more sophisticated tasks required in a computer installation.

Our Unlimited Guarantee

So there's no risk to you, all of our books are sold with this unusual guarantee. If you can't learn assembler language from our books, you can return them for a complete refund no matter how long you've had them. In other words, you must be satisfied.

So mail the coupon today. For each book ordered, I'll bill you $15 plus postage (plus sales tax in California). If our books work as I've guaranteed, they will repay their purchase price many times over.

Attention: Training Managers

If you are in charge of training for your company, write us today for a complimentary copy. Based on all tests to date, our books will outperform any other instructional materials at any price. If you prefer to call, our number is 209 229 8111.

Mike Murach & Associates, Inc., 4905 North West Avenue, Suite 102, Fresno, Ca. 93705

Gentlemen: Please send me the copies of *System/360-370 Assembler Language* that I have indicated below. If I'm not satisfied, I will return the books for a full refund no matter how long I've had them. I understand that I will be billed $15 plus postage (plus sales tax in California) for each book ordered.

Quantity	Version
________	**DOS (407 pages)**
________	**OS (450 pages)**

SAVE $2.50: Send cash with order and your price is $12.50 per book plus 50c for postage and handling (plus 75c sales tax in California). The unlimited guarantee still applies. If you return the book, you will receive a prompt refund.

Name and Title ____________________

Company ____________________

Address ____________________

City, State, Zip ____________________

Rent or Buy? Look at Fiscal Profile, Users Told

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — How should you acquire your next computer system — through purchase or rental? Which financing scheme will cost less in the long run?

The answers to these nagging financial questions defy easy formulation, according to Lance Wayman, head of Wayman and Associates, a management consulting firm in nearby Redondo Beach.

Speaking on the subject of "Evaluating Systems Financing" Wayman told about a dozen attendees of the Computer Expo '78 conference here recently that the terms under which a computer system is aquired should be based on the prospective user's financial profile.

No two users have exactly the same fiscal characteristics, and an acquisition plan that suits one company to a tee could prove extremely unsatisfactory for another, Wayman noted.

Working Capital

If a company has large sums of working capital at its disposal, it would probably do well to buy a computer, Wayman advised.

Unfortunately, purchasing "ties up" funds that otherwise could be applied toward alternative corporate investments. If a firm's business lies outside the computer field, it should probably invest its capital in resources more directly related to its corporate needs and thus opt for a rental rather than a purchase agreement, Wayman urged.

A second factor users should keep in mind when deciding whether to buy or rent a computer involves taxable income. Unless users boast a large taxable income, they probably will not benefit much from the depreciation credit for which they can qualify under a purchase agreement, he said.

Thus, most users with relatively small taxable incomes should probably choose a rented over a purchased computer system, Wayman added.

Investment Tax Credit

A third criterion concerns investment tax credit, which, though variable from year to year, currently averages about 10%. If high operating overhead temporarily cuts a firm's taxable income and thus the amount of its tax liability, the organization might want to consider renting a system during the high-cost period and then buying the machine later when income increases and the advantages of tax credit become more attractive, he said. A fourth factor users should consider when formulating their financing plans is hardware life cycles, Wayman advised, adding that on the average, a CPU remains operational for about eight years.

If a firm is contemplating acquiring a system introduced several years earlier, company officials should at least consider renting the equipment for the duration of its expected life span and then buying a replacement when the succeeding generation appears, Wayman recommended.

Neither buying nor renting is a perfect financing arrangement, even when users make their decisions intelligently. Both methods carry liabilities as well as advantages, he said.

Among its advantage, buying allows companies with the right financial profile to capitalize on tax depreciations and tax credits. It also gives users almost unlimited applications flexibility. "Users who purchase their systems can do with them what they will," Wayman explained.

On the other hand, purchasing also can force users into compromising obligations. If a system fails to perform as expected, users may find themselves "stuck" with an unwanted and useless piece of equipment. Fortunately, a strong market for used computers has emerged in recent years, and such systems are fetching 50% to 60% of their original purchase price, Wayman said.

Double-Edged Sword

Renting, meanwhile, is also a double-edged sword. It imposes few risks; if a customer decides after signing a rental agreement that he dislikes his new system, he can easily replace it.

Renting also minimizes the dangers of hardware obsolescence, Wayman continued.

On the other hand, he explained, it is the most expensive of all financing schemes, and users who rent their machines for long periods stand the risk of paying more than if they had bought the equipment outright.

Digital Equipment Corp. Data General Corp

PDP-11, NOVA & INTERDATA users

handle your Tape and Disc System needs...

...with performance never before available

- Software Compatible for PDP-11, Nova & interdata
- Embedded design
- 9 Trk 800/1600 bpi, 7 Trk 200/556/800 bpi intermixed
- 12.5 to 125 ips

- Software Competibie for PDP-11 & Nova
- Embedded design
- Top Load (5440) & Front Loed (2315)
- Up to 20 mb per drive

WRITE FOR COMPLETE INFORMATION

western peripherals T.M.

(714) 991-8700 • TWX: 910 591-1687 • Cable: WESPER
1100 Claudina Place, Anaheim, CA 92805

If you think shipping computer supplies in 24 hours is a bluff, call us on it.
800-258-1710.

The fastest way to get Digital computer supplies is to call us direct. We'll ship orders in 24 hours; in emergencies, less than 24 hours.

You'll not only get the fastest service you've ever had, you'll also be getting the most thoroughly quality tested supplies for Digital computers you can buy. All at a minimum 5% discount.

If you don't have our supplies brochure, give us a call at the same number. Monday through Friday, 8 AM to 6 PM EST.

800-258-1710. In New Hampshire, 603-884-5718. For your convenience, you can order supplies from us on your Master Charge or American Express cards.

If you think it's a bluff, all you have to do is call.

digital
SUPPLIES

IN DEPTH
IN DEPTH
IN DEPTH

Structuring Your Workstyle

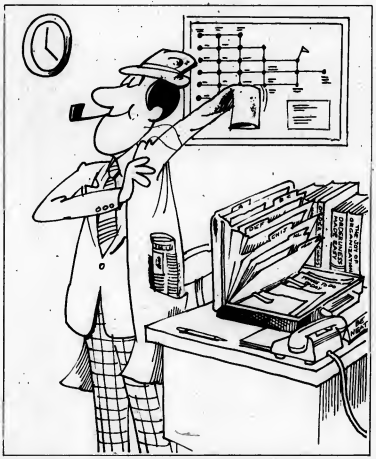
By Joan Knutson And Marie Scotto

Alvin Toffler said in his book *Future Shock*, "The computer burst upon the scene around 1950. With its unprecedented power for analysis and dissemination of extremely varied kinds of data in unbelievable quantities and at mind-staggering speeds, it has become a major force behind the latest acceleration in knowledge acquisition.

"Francis Bacon told us that 'knowledge . . . is power.' This can now be translated into contemporary terms. In our social setting, 'knowledge is change' — and accelerating knowledge acquisition; fueling the great engine of technology, means accelerating change."

We as systems people are not only being forced to cope with this accelerated pace of development, we have on our shoulders the responsiblity of spearheading the design of these computer systems of change. Let's take a look at what is happening to our everyday jobs and making us search for a way to control and manage our time:

- Our jobs are becoming more and more complex (the understatement of the year).
- Our jobs are often integrating a service:
  - For many areas, many people in the organization.
  - Complying with several company objectives.
  - Juggling ever-changing priorities.
- Our jobs require decisions that depend on knowledge of a technology that is doubling every five years (or less).
- Our jobs require more and more a corporate payback in efficiency and money in a shorter period of time.
- Our jobs are deemed unsuccessful because of time slippages and cost overruns which may be substantially out of our control.
- Our jobs are being conducted in diverse organizational structures that present operational problems (see Figure A).



Structured design is not just a programming concept — it's also a technique that can enable us to use our workday more efficiently and effectively. The authors explain why and show how to begin.

These are just some of the pressures that are being exerted on the systems person. It's not hard to see why he never has enough time during the day or why he keeps taking work home in his attache case.

Isn't it appropriate that he start using some of his analytical skills to regain control of his personal time?

General Concept

Many of the business management techniques that help us cope in this environment of change are based on one premise. That premise is: Break "it" (whatever "it" may be) down into manageable pieces.

We call this "cascading analysis." Take the entire "it" and keep dissecting into lower and lower levels of detail until you feel in control and, in most cases, until you can quantify that level of breakdown.

Let's take a look at some examples already in existence:

- *Project Management* is taking the entire job, called the project, and breaking down the work effort into small, manageable segments such as activities and tasks. This is called developing a work breakdown structure (WBS).

These smaller, controllable segments of work then can be assigned a time estimate, can be graphed into a network analyzing the interrelationships of these tasks and can be used to develop a schedule, a human resource loading plan, a budget.

These are then used as status reporting tools. From this initial concept of breakdown of work effort comes a

(Continued on Page 12)

IN DEPTH

(Continued from Page 11)

whole multitude of planning and controlling techniques.

- *Management by Objectives* is taking a person's job and isolating the major responsibilities, then breaking those responsibilities into lower and lower levels of detail until a quantifiable goal can be placed on each responsibility.

These goals or objectives then become the development guidelines from which the employee works and the performance guidelines by which the employee is reviewed at appraisal time.

Again, before the technique can be implemented, it is necessary to break the job down into manageable, controllable pieces.

- *Structured Program Design* is taking a program and breaking it down into controllable modules or subroutines. First the "mainline" is constructed; this merely forms the foundation from which many different modules can be hung.

Much time and thought is spent in the structure of the program before any time is spent in techniques of coding the routines. Thought is put into what each module is meant to do; further, consideration is given to whether each module should be broken down into submodules to make the design more manageable.

> *'Sometimes when we are very "up," we seem to be able to do many things simultaneously. However, aren't those things usually trivial?'*

Once again the concept of cascading analysis or the breaking down of a larger entity into smaller pieces is used to make it easier to cope with the work effort.

If we can accept the basic premise of dissecting the "whole" into its pieces in order to make the "whole" more manageable, more within our control, then we can look at cascading analysis in our personal time and how structued design may be the technique to use to isolate our own WBS.

Personal Management

Even Ed Yourdon in one of his many books on structured design, *Techniques of Program Structure and Design*, warns us away from multitasking and multiprogramming. He says they are "potentially dangerous" and "make testing (implementing) much more difficult," Yourdon is, of course, talking about a computer systems design; but doesn't what he says also apply to the management of our personal time? Juggling several tasks at one time is also potentially dangerous and can en-

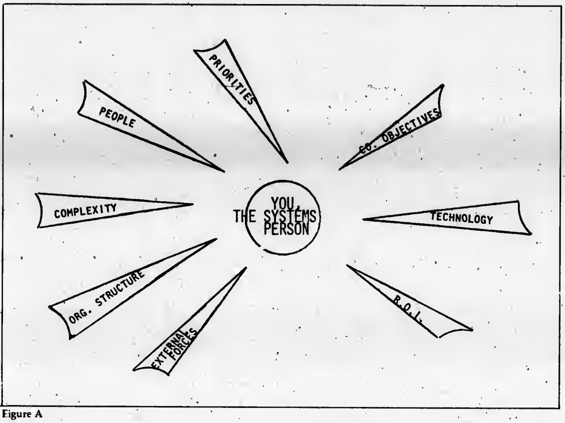


Figure A

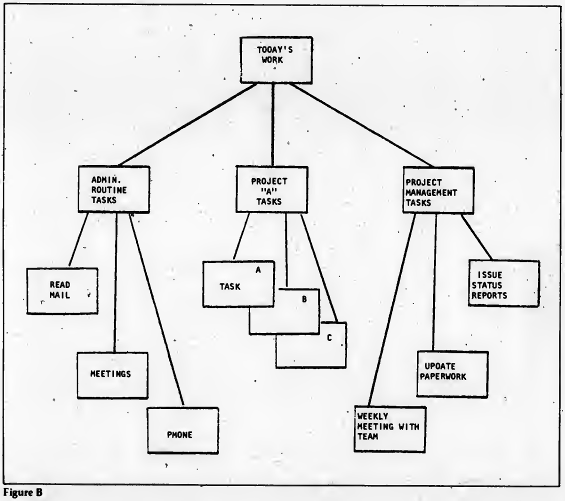


Figure B

IN DEPTH

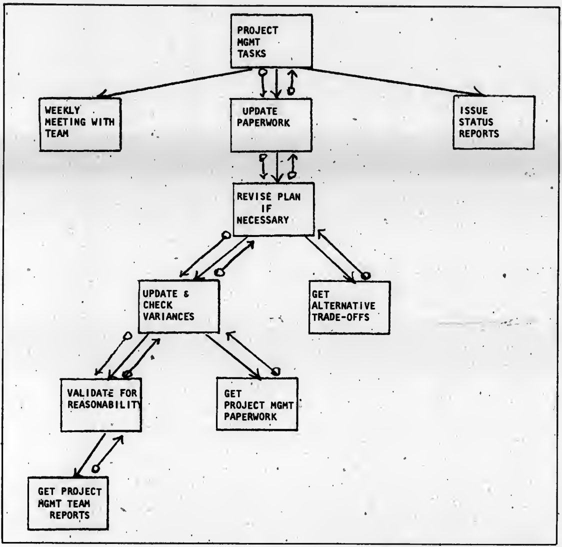
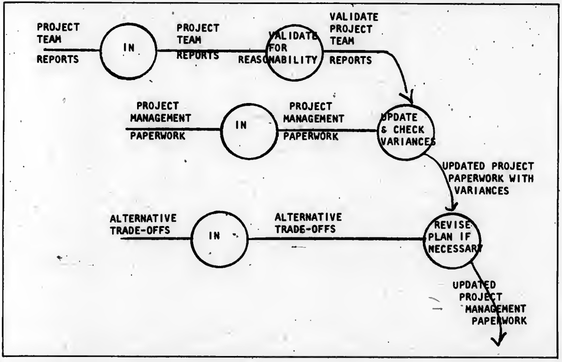


Figure C (above) and Figure D (below)


PROJECT TEAM REPORTS
IN
PROJECT TEAM REPORTS
VALIDATE FOR REASONABILITY
VALIDATE PROJECT TEAM REPORTS
PROJECT MANAGEMENT PAPERWORK
IN
PROJECT MANAGEMENT PAPERWORK
UPDATE & CHECK VARIANCES
UPDATED PROJECT PAPERWORK WITH VARIANCES
ALTERNATIVE TRADE-OFFS
IN
ALTERNATIVE TRADE-OFFS
REVISE PLAN IF NECESSARY
UPDATED PROJECT MANAGEMENT PAPERWORK

courage mistakes.

Sometimes when we are very "up," we seem to be able to do many things simultaneously. However, aren't those things usually trivial? The major assignments keep getting put off until later.

In fact, it becomes so much easier to deal with the interruptions and paper pushing that we can't get into the mood to really concentrate on any substantial work effort. And what is worse, when we come down, everything starts going wrong.

What we need to do is to isolate those modules in our personal time to a level low enough that we are in control. We can then set time estimates, determine priorities and create a schedule. Then we must concentrate on one work effort at a time, "pushing" to meet the time estimate we have set.

In other words, there is a mission which can be broken down into several purposes. These purposes can be isolated to a set of objectives, each of which must have definable goals with a predetermined output at the end of an estimated period of time.

Using the Theory

In his book on time management called *The Time Trap: How to Get More Done in Less Time*, R. Alec MacKenzie said "Only one in a hundred supervisors has enough time." That definitely is not me; I assume that it is not you either. So we will be forced to consider personal time management.

MacKenzie also said, "One does not manage time but oneself in relation to the clock."

The first thing we must do is to utilize our cascading analysis theory, which is beaking our day's work effort into controllable modules. To do that, we must do some homework.

For the next couple of weeks, keep a time inventory log. Write down everything you do, when you started it, when you finished it.

This will serve two purposes — to isolate similar work efforts that will make up your work modules and to isolate your time wasters, which must be done away with by a smart structuring of your work modules.

Did you find these as some of your time wasters?

	Yes	No
Procrastination	☐	☐
Lack of Self-Discipline	☐	☐
Visitors	☐	☐
Telephone	☐	☐
No Priorities	☐	☐
Lack of Delegation	☐	☐
Trash Mail	☐	☐
Unscheduled Meetings	☐	☐
Training New Personnel	☐	☐

The structuring of your everyday work effort will eliminate many of

(Continued on Page 14)

(Continued from Page 13)

these by:

- Predefining work modules.
- Setting priorities.
- Creating schedules.
- Psychologically committing yourself to this disciplined regime of getting the job done.

Now what have you isolated as your work modules? They could be such efforts as:

- Reading mail.
- Technical reading.
- Scheduled meetings.
- Unscheduled meetings.
- Scheduled phone calls.
- Unscheduled phone calls.
- Meetings with staff.
- Project variable "A."
- Project management paperwork update.
- Schedule preparation for the next day.

There are probably many more. Try not to develop more than you can control, but develop the work modules so they are small enough to put a time estimate on.

> *'What we need to do is to isolate those modules in our personal time to a level low enough that we are in control.'*

Now you have put structured design into your everyday lifestyle. Modules/routines exist that are performed in the order of priority which you determine and upon which you concentrate your efforts to complete in the most efficient time possible.

Graphic Display

As systems people, we feel more comfortable when we can "flow" or graph something. There are several structured design alternatives to pictorialize the management of your personal time.

"Structured design" as developed by Larry Constantine and Ed Yourdon looks to the flow of the inputs into the job to create outputs (see figures B, C and D).

"Hipo Methodology," or hierarchical input processing output, contends that the inputs and the outputs are basic concepts (see Figure E).

The "Jackson Methodology" requires that our output structure be parallel to the structure of our input (see Figure F).

The "logical construction of programs," which is more popular outside the U.S., would have us use "Warnier diagrams" adding sequencing procedures (see Figure G).

It would not be practical to diagram 99% of the everyday tasks you do; this analysis you do in your head, However, the 1% that is a new work effort might be helpful to chart.

But it does show that the same concepts that are being used in structured

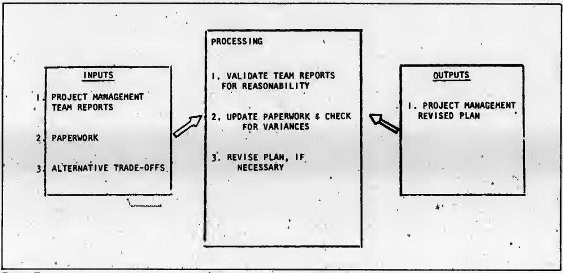

INPUTS
1. PROJECT MANAGEMENT TEAM REPORTS
2. PAPERWORK
3. ALTERNATIVE TRADE-OFFS
PROCESSING
1. VALIDATE TEAM REPORTS FOR REASONABILITY
2. UPDATE PAPERWORK & CHECK FOR VARIANCES
3. REVISE PLAN, IF NECESSARY
OUTPUTS
1. PROJECT MANAGEMENT REVISED PLAN

Figure E

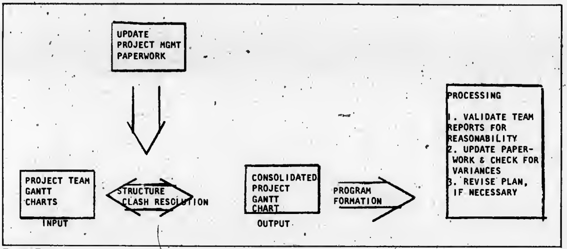

UPDATE PROJECT MGMT PAPERWORK
PROJECT TEAM GANTT CHARTS
INPUT
STRUCTURE CLASH RESOLUTION
CONSOLIDATED PROJECT GANTT CHART
OUTPUT
PROGRAM FORMATION
PROCESSING
1. VALIDATE TEAM REPORTS FOR REASONABILITY
2. UPDATE PAPER-WORK & CHECK FOR VARIANCES
3. REVISE PLAN, IF NECESSARY

Figure F

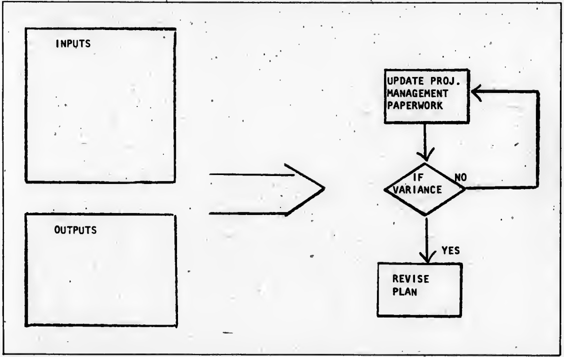


Figure G

design can be used in your management of your personal time:

- Breaking down the effort into manageable modules.
- Putting priority on the most important modules.
- Assigning a time estimate and "pushing" like mad to meet your time estimates.
- Trying not to allow anything to interrupt the processing of your work module.
- Stressing efficiency and discipline in everything you do.

Good luck!

Knutson and Scotto are co-authoring a systems-related book for Amacom, the publishing arm of the American Management Associations (AMA). The two are principals in Associates for Human Resource Development, Inc. (AHRD), a New York-based consulting firm offering both manual and computer systems analysis and design support as well as systems/project management training packages and tailored courses.

Prior to forming AHRD with Scotto, Knutson worked for a major New York department store as a systems manager for all merchandising report systems. She was involved in the installation of various systems, including computer output microfilm and an accounts receivable billing system, and was also responsible for the technical and training aspects of an optical scanning system.

Knutson, who received her B.S. degree from Ohio State University, has spent eight years as an analyst, project leader, assistant DP manager and systems manager heading teams of various sizes in cost evaluation and development and implementation of management information systems.

She is a former chairman of the Metropolitan Chapter of the Association for Systems Management (ASM) and has just been elected international treasurer of that organization..

Scotto worked as corporate training director of Alexander's department store, where she was responsible for planning and implementing training programs in merchandising, operations and finance as well as supervising all of the store's training personnel..

As a DP analyst, she has worked on point-of-sale, warehousing, financial and merchandising systems.

In the systems field, Scotto has functioned as a manual systems analyst and was responsible for Alexander's corporate procedures and systems manuals.

She is past secretary and treasurer of ASM, a member of the NRMA Merchandise Information Research Committee and chairman of the committee's task force on the use of data base in the retail industry.

Scotto has attended Nassau Community College and New York University.

If you're getting a 3033, 3032 or 3031 in 1978, get a lease proposal from us in 48 hours.

Just call: (516) 488-7876 (collect).

If you want the best lease rates available in 1978 on the new 303X Series of computers, EFM Computer Leasing has the financing in place for you right now.

Just say the word and we'll get you a lease proposal within 48 hours. You'll find the documentation in it standard and easy to read. And if you wish, EFM can provide for upgrading.

All of our leases are backed up by 10 years of EFM experience in computer leasing – which means a proven track record with customers all over the country.

If you'd like more information, send in the coupon for a free copy of our brochure. But more importantly, if you're looking for a lease in 1978 on a 3033, 3032 or 3031, call us. We'll have a lease proposal on your desk within 48 hours.

☐ Please send me a free copy of the EFM Computer Leasing brochure.

☐ Have an EFM representative call me.

Name________________ Title________
Company________________________
Address________________________
City__________ State________ Zip______
Telephone______________________

EFM Computer Leasing, Inc.
A Subsidiary of the EFM Group
3000 Marcus Avenue
Lake Success, New York 11040
(516) 488-7876

EFM Computer Leasing is a member of the Computer Lessors Association

INTERNAL REVENUE

problems got you down? If your taxes aren't finished why not let your computer do it for you. Volume VIII has just been released! It contains a SUPER 1040 Tax program that fills out Schedule A and handles inputs from supplemental schedules B, C, D and F. It has all the new tax revisions in it and is complete and ready to run. In addition there are a number of other programs included on: interests, mortgages, installments and more. Volume VIII is only $19.95 plus $1.50 for UPS delivery. Hard to believe?? Our Volume VI which contains our Mini-Ledger is only $49.95 and Volume VII which contains our powerful Word Processor and other programs is only $39.95. Bankcards and COD orders call 800-327-6543. For information only call 305-361-1153. Mail orders please remit to:

SCIENTIFIC RESEARCH
220-W Knollwood
Key Biscayne, FL 33149

Look ITT Up in the CW Index

Editorial

Breach of Users' Trust

Honeywell Information Systems, Inc., epparently plagued by problems in developing circuitry, has withdrawn its 66/85 computar from the market — more than a year after it was announced.

If IBM had made such a move, industry pundits would be calling it an anticompetitive act and accusing IBM of announcing a "paper" machine it knew it could not deliver.

Of course, HIS, as much as it would like to, does not hold IBM's position in the industry. Nevertheless, announcing equipment, taking orders and then withdrawing It is still a very serious breach of users' trust.

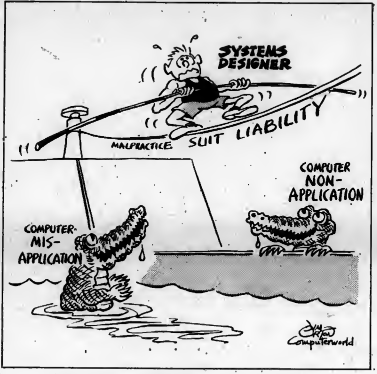
Computer systems are tremendously complex developmant projects, and announcement often has to come fairly fer in advance of delivery in order to let users know what to expect in the way of future offerings from a firm. Unforeseen problems do crop up that can delay or force cancellation of such projects.

Howaver, computer manufacturers hava a responsibility — abdicatad in this case by HIS — to be sure they can deliver what they promisa.

No system should ever be marketed to users until the firm knows it will actually be able to produca the product. Without specifically praannouncing products, which is illegal, companies could let usars know that thay plan to continue to pursue certain market areas without announcing the specs of what turn out to ba "paper" machines.

In the spacific casa of the 66/85, HIS has forfeited what credibility it had with the user community. How can users believe any future HIS product announcamnts until thay actually see a working systam?

Users should adopt a wait and sae attitude with HIS from now on. After all, no one wants to get caught holding the bag for a firm that cannot produce what it promises.



Amazing Growth

In seven years, the independent software industry has come a long way — from 29 packages that achieved sales of over $1 million to 302 that have reached that status [CW, March 27].

This is an impressive gain and clearly shows user acceptanca of such packages.

Slowly but surely, users appear to be losing their "not invented here" syndrome and this is a good sign.

There is little reason for computer users to spend time developing software that can be purchased on the outside for a lower total cost. By purchasing basic packages, they are freed to spend their time and scarce programming resources tackling programs that offer a greater potential payoff for their firms.

Instead of spending man-years developing a payroll package that is relatively standard, for example, they can spend the tima daveloping programs that help their management run their particular businesses better.

So while the software industry should be congratulating itself for its rapid growth and new stature, it should always remember the users who made it possible and continue to provide them with constantly improved ways of doing their jobs.

Data Past

Five Years Ago
April 4, 1973

NEW YORK — An intensive investigation was launched here to try to determine how both computer and manual records were manipulated to produce what was one of the largest embezzlements in history from a savings bank. Union Dime Savings Bank teller Roswell Steffen was arrested and charged with embezzling approximately $1.5 million from the bank in a scheme allegedly carried out over a three-year period. Bank officials noted that Steffen never had direct eccess to the computer room and that the scheme was never caught hy the bank's computer system or by its manual checks.

— — —

MAYNARD, Mass. — Fortran IV cama to PDP-8 minicomputers, and the way Digital Equipment Corp. implamented the language processor, the user had the option of how fast he wanted it to run. The Fortran IV ran under OS/8 on any PDP-8 with at least 8K words of core and a mass storage device.

Eight Years Ago
April 8, 1970

WASHINGTON, D.C. — The Federal Communications Commission [FCC] decided that regulated common carriers should be prohibited from providing DP services unless they establish separate and independently competing corporate entities.

— — —

NEW YORK — A display terminal that used photochromic glass to eliminate the need for image refreshing and to provida truly flicker-free images was described here in a paper presented by G.K. Megla of the Corning Glass Works, Raleigh, N.C., at the annual show of the Institute of Electrical and Electronics Engineers. The terminal, scheduled to be shown for the first time this week and to be available for delivery in the near future, would be produced by a Corning subsidiary, Corning Data Systems.

Letters to the Editor

Less Wasted Time, Expense

Concerning the dialogue between Alan Taylor and Matthew Mitchell on choosing legal counsel ["DP Too Specialized for Regular Lawyers?" CW, March 27], it's true that some exceptionally brilliant lawyers have tha ability to rapidly absord the esoterics of the computer industry. However, it makes more sense to hire a lawyer who can concentrate on your problems rather than learn, at your expense, tha difference betwean hardwara and softwara.

The wise computer user or supplier will seek legal advice well in advance of the thought of litigation. Ironically, one true test of a DP lawyer's effectiveness is the obsence of the need for litigation.

Edward C. Saltzberg
Boston, Mass.

Needs Professional Advice

With regard to Robert S. Yount's article "Small Systems Vendors Better Learn English" [CW, March 13], he had better learn the difference between a microcomputer and a minicomputer, a hobby store and a computer vendor, and system software and applications software.

The reason the people to whom he spoke in the "small system stores" could not tell him what size system he needed for his applications is that the stores are really small computer hardware stores. They offer the raw hardware, a rudimentary operating system and not much else. They do not offer "turnkey" systems.

Yount indicated that ha and his accountant did not plan to do programming. If this remains the case, unless he plans to hire a programmer, he should probably go to one of the major vendors of minicomputers, planning to contract his programming to independent third parties, or go to a major mainframe vendor who supports minicomputers and contract with the vandor.

An all-important point to consider is cost. One can purchase a microcomputar configured with peripherals as he appaars to need them for from $4,000 to $7,000 and can try to find someona to write the software for as much as $10,000. Or, one can go to a vendor who has much of the software alreedy written, for standard systems it supplies and plan to spend from $10,000 to $50,000.

L. Edward Reich
Arlington, Va.

Get your Universes Straight

When I read "Users Award Xerox, Amdahl Top Grades," [CW, Jan. 32] I promised myself I would not write this letter. But your subsequent publication of two letters from R.E. Kaufman [Feb. 6, March 6] prompted me to do it anyway.

In spite of the fact that Kaufman was right in his criticism and comments on sampling, he, like CW, failed to come to grips with a major flaw in the study methodology.

Although there is ample empirical evidence to prove it, just plain common sense should tell one that there is a difference between people who return mail questionnaires and those who don't. Since the article presented findings based on returned questionnairas, we must assume there was no attempt to contact those who failed to respond, to learn their answers.

If this kind of "research" and presentation of findings must be done, then such findings should be preceded by a nota indicating that the analyses and rasponses represent the views only of those who responded and should not be interpreted as reflective of the universe with the same characteristics.

John J. Cabouch
Randallstown, Md.

Views of Responsibility

Ethics Issues Prompt Thoughtful Responses

By Jack Stone
Special to CW

Adom Begonoh, that unlucky paragon-of-virtue DP manager who suffered the inquisition of the pseudo-Ethics Council in my recent column [CW, Nov. 28] created quite a stir among Computerworld readers.

I have selected excerpts from two of the eloquent letters I received on the subject.

The first suggests that the DPer's organization can clear away any misconceptions on ethical questions by a written agreement prior to employment. The second states that the ultimate responsibility falls on the individual DPer who can be guided by the eternal Golden Rule.

Dear Jack:

I read with pleasure, both as to content and expression, your article "Ethics-Council . . ." I not only agree with your assessment of the Redskins' play, but have shared your convictions (or those of Begonah) for so long that it has been a mystery to me why there is all this constant and contentless debate over ethics regarding software development.

I once worked for a small electronics company employing a single engineer who possessed traits similar to those of a good software person. This man invented a reduction gear that was a model of ingenuity; it was cheap and effective. He came in evenings and drew it on our drafting boards, paid for the prototypes himself and then felt that the idea belonged to him even though it was applicable to a product in our business line.

Another engineer, who had previously held the same position, but separated from us to form his own business — buying from us technology he had developed while in our employ to do so — felt quite strongly that this was so unethical he would have fired the man.

The solution to the ethics question seems to me to be simple and straightforward. Where law or the commercial code is muddy on a moral issue and individuals could hold differing views, it is up to the company to clarify the matter. Most high-technology companies require, as part of an employment agreement, the signing of disclosure and patent assignment clauses by the employee.

I see no reason why the same practice should not be used by employers of DP personnel. It would then be up to the company to determine whether it wanted to hire anyone who did not want to sign the agreement.

Professional society codes of ethics are all well and good, but a wealth of examples from the medical, legal and technical professions should warn us about their effectiveness. They look great as plaques on the wall.

Bruce Barry
Information Resources Manager
Bowles Farming Co.
Los Banos, Calif.

The Human Connection

Dear Jack:

I just finished reading your article on professional ethics and enjoyed it very much.

If I may, I would like to add my thoughts on the subject, because it is, indeed, a problem that won't go away and will intensify as time goes on.

Setting up or establishing ethical standards may be all well and good; however, if anyone wishes to evade, ignore or frustrate those standards it is a very easy thing to do.

Ethical standards of behavior without some sort of enforcement are as useless as a law that is ignored by both the police and the public. In fact, it is worse than useless. It is counterproductive because it results in a general attitude of disrespect for all laws or standards.

Ethical standards are a good thing to put down for all to see (like the Ten Commandments) and for all to try to live up to, but they won't be observed except on an individual, one-by-one basis.

The most recent vogue is "group" ethics or morality (practiced much like the tribunal in your article where a group of people get together and vote on what is ethical and what is not. The euphemism is "situational ethics." This concept implies that right and wrong are simply the results of the situation in which one finds himself. What is "right" today may be wrong tomorrow, depending on the situation or how the ethics committee chooses to vote at the time. (Remember Watergate?)

When we meet our Maker, we will not have a cheering section or ethics committee on hand to advise Him on whether or not we get into heaven. We will face Him alone and pass or fail on our own merits.

To me, ethical behavior is a very simple thing. It's embodied in the expression, "Do unto others as you would have them do unto you. It's not the currently faddish thought, "Do unto others before they get a chance to do unto you." No group can settle this for you. It is up to each of us to decide what we do and how we want to work.

William A. Delany
President
Analysis & Computer Systems, Inc.
Burlington, Mass.

Legal System at Fault

Rip-Offs Recognized, But Not Prosecuted

The Taylor Report
By Alan Taylor CDP

As readers know, the handling of the Saks Fifth Avenue H3 accounts reported in this column [CW, Dec. 26-Jan. 2] attracted the attention of the Federal Trade Commission (FTC) staff as well as that of many readers with their own knowledge as to what happens to consumers who leave credit balances in inactive accounts — the balances have a tendency to disappear without a trace.

As a result of the FTC interest, I paid a visit to Justin Dingfelder in Washington ["Consent Order Violation?", CW, Feb. 27] and talked with various other FTC officials in both the prosecution and compliance areas. It was an interesting visit in many ways, but the main, professionally important result was that I now think the systems-efficiency resource-allocation characteristics of our legal procedures tend to get programmers, system designers and operators off the hook — and that was something none of the readers who wrote in had pointed out. It does not, of course, get managers who ignore the law off the hook.

The history of the credit balance investigation apparently started when some "little old lady" wrote the FTC about her particular case. On investigating, the FTC found only one firm (Sears Roebuck & Co., Inc.) had a policy of refunding credit balances of more than one dollar within a few months after an account becomes inactive. The other firms across the country acknowledged, when pressed, that they were hanging on to the money.

The FTC thought that hanging on to credit balances was not right, but ran into a problem. Some of the courts believe the FTC cannot order a firm to return money to consumers, only to cease and desist from taking any more from them.

Because of this doubt as to what the FTC can do, a compromise was worked out and the FTC arranged to have millions of dollars returned.

What is important is that now the vanishing of credit balances and other equivalent items — such as using the 10 rip-off techniques reported here last month [CW, Feb. 27] — are generally known.

Common and Notorious Theft

A simple reading of the law indicates these rip-off procedures are theft — "common and notorious theft" to put a label on it. They are against the criminal law of the states, and anyone knowingly acting to help such thefts — even though he does not pocket a penny — is guilty of "conspiracy."

So far, so good. Most *Computerworld* readers got the idea that the systems analysts designing such procedures would have a hard job claiming they did not know, or should not have known, the purposes of those procedures. And, if we left the matter there, then our profession is full of "common and notorious thieves" and conspirators.

But then comes the problem. A person is not a criminal unless convicted of a crime, and only certain officials in the various states can charge people with crimes. By selecting not to bring charges — although knowing through the FTC investigations, to which they certainly had access, that these rip-offs were going on — state officials are exempting the conduct from being considered as criminal! In fact, if there were a charge of conspiracy in aid of common and notorious theft brought now, after years of having the matter ignored by the states, then perhaps the defense would be able to claim that the attorney general, or whoever was prosecuting, was also a conspirator.

The reason for this legal restriction on prosecution is of course to prevent the courts from being overloaded or bothering people with unfounded charges. The effect on modern-day computer people, however, is that whole areas of potentially criminal conduct, not having been prosecuted although being noticed, must be regarded as noncriminal, no matter what the law says. (Try that for a May 1 speech on the Rule of the Law.) And there can, as I see it, be nothing wrong in the actions of the coders, operators, systems analysts and others in helping their employers.

It all adds up to the position everything is in now: Programs that rip off consumers are standard tasks to be written and used with little or no protest. But the rationale is different. It is not all right just "because everyone does it" but because the "conspirators'" conduct is not criminal at all when the officers of law use their legal discretion and choose not to deem it criminal and enforce the law.

This may be a bit disheartening for many idealists. However, it is a lot nearer the reality and legality of the situation than we ever got before. Computers and computer professionals are not to blame for the results.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

Calls Concept Easy to Sell

Vendor Expects Codasyl DBMS From IBM

Reader Commentary

By John J. Cullinane
Special to CW

I have been interested in the exchange of reader commentaries in *Computerworld* between L.B. Towner [CW, Feb. 6] and those who took exception to his strong position in support of Codasyl data base management systems (DBMS).

What is interesting in these articles is that IBM's IMS-DL/I is categorized as a nonstandard DBMS. This in itself is reasonable; however, I believe IBM requires a lot more attention than these relatively modest mentions of its presence in the DBMS arena.

What are IBM's plans relative to a Codasyl DBMS? Will IBM introduce a Codasyl DBMS? I think so. The answer comes in understanding IBM and its motives properly.

First, one has to believe that IBM is really in the business of selling computer hardware. It always amazes me how many people think of IBM other than as a seller of hardware. They somehow believe IBM is really something like YMCA — an altruistic institution with their best interests at heart.

IBM is a business, and it has to protect its customer base from erosion by competitors. Standardization makes it easier for competitors of IBM to build competing hardware and software products and attack this customer base in a systematic, cost-effective way.

Consequently, I believe IBM has been against standardization in the past until such things as Cobol were forced upon it. Lack of standardization protects IBM's customer base from competitors.

After all, the more difficult it is to convert from an IBM computer to, say, a Honeywell or Univac system, the less likely it is to occur.

A very significant point in computer hardware is that IBM has the biggest single share of the computer market. The key factor in data base management is that IBM does not have the biggest share of the data base management market.

Independent vendors of DBMS and hardware vendors outsell IBM and in the aggregate have a very substantial share of DBMS market, perhaps two to one. Thus, we have in the DBMS market a set of circumstances opposite to that in the hardware market, where standardization does indeed have potential benefits for IBM, particularly if one agrees that IMS has pretty much run its course and that it ultimately will have to be replaced.

The question then is what type of DBMS will give the greatest benefits to IBM and still be the least burden on existing IMS-DL/I users. By coming out with a Codasyl DBMS, IBM can position itself beautifully against the majority of "nonstandard" DBMS suppliers; and, since Codasyl can accomodate any IMS-DL/I data structure, the conversion would be a manageable one — one that IBM could sell to its customers without too much difficulty, all in the name of standardization.

In addition — and here is the rub — IBM can easily convince users of Codasyl systems on non-IBM computers to convert to IBM's computers. Also, IBM might be able to convince an IBM mainframe user with an independent vendor's Codasyl DBMS to convert to IBM's Codasyl DBMS.

In the past, I have seen IBM unofficially promote a Codasyl DBMS when it was in its best interests to do so. Specifically, I am referring to situations where a non-IBM computer user was using a Codasyl DBMS and was interested in converting to IBM hardware but did not want to use IMS or DL/I.

The independent vendor's Codasyl DBMS was subtly introduced as a possible alternative in these situations, clinching the deal for IBM.

End to Problems

The announcement of a Codasyl system from IBM will have the traditional effect of delaying many DBMS decisions normally granted to independent vendors until such time as users have an opportunity to evaluate IBM's offering.

Nevertheless, how good an implementation of Codasyl specifications it is will determine the ultimate degree of its success and the impact it will have on independent DBMS supplies. But, by the single stroke of announcing a Codasyl DBMS, IBM will solve a number of major problems, namely:

- Getting out from under IMS-DL/I.
- Positioning a number of major independent DBMS vendors as vendors of nonstandard DBMS and thus possibly undesirable.
- Capturing a greater share of the DBMS market, perhaps more consistent with its hardware share.
- Making it easier to convert users of Codasyl DBMS on other vendors' hardware to IBM.

After all, nothing is really a standard in the computer industry unless IBM says it is. Since IBM has already shown a dramatic change in its position vis-a-vis Codasyl via its positive votes on recent Codasyl questions, I think this is an indication that something is cooking.

In other words, IBM may have finally decided that a Codasyl DBMS will be good for IBM's business. Since IBM has at least three of everything under development, including a Codasyl DBMS, it is relatively easy for it to "announce" on short notice a system that exists to some degree. I think it will.

Cullinone is president of Cullinone Corp., producer of doto manogement softwore in Wellesley, Moss.

AD-VICE

Neither a borrower nor a lender be
For log oft loses both itself and friend;
And borrowing dulls the edge of husbandry.

Refrain from log polygamisting,
Sharing one communal listing
With all partitions coexisting—
Start CONSOLOG monogamisting:

It prints your log when your job's ended—
All the time, or when abended.
No waiting 'round till DOCs is dumped;
Or interruptions when you're stumped.
Every person has his own—
Yours is yours, and yours alone!

This above all, to thine ownself be true;
Your CONSOLOG message belongs to you!

CONSOLOG

Automatically logs partition console messages to the printer at end-of-job.

Eliminates printlog utility runs that interrupt normal processing.

Lets you select message logging for all jobs or only for abends and tests.

Uses no core, installs in minutes on any IBM 370 DOS/VS with DOCs (125D) or 3277.

Free 30 Day Trial

☐ Send More Info ☐ Send CONSOLOG for 30 Days
Name ____ Co. ____
Title ____ Tel. ____
Address ____
City ____ State ____ Zip ____
Computer Model ____ ☐ 125D or ☐ 3277

DATACHRON CORP. 174 FIFTH AVE. NEW YORK, N.Y. 10010 (212) 675-5333

3830-2
Control Units
AVAILABLE
WITH
MADRIDS
COMDISCO
312-698-3000

DECwriter IIs & IIIs
FOR SALE
• LA36 • LS120
[illegible]
800-323-2288
IN ILL. CALL 312 279 1960
ICE INC
722 N Church Rd
[illegible]

The full-year issue of the 1977 Computerworld Index is now available.

Write or call for details.

INDEX
COMPUTERWORLD
797 Washington Street.
Newton, MA 02160
(617) 965-5800

But Teacher/Staff Ratio Low

DP Training Budgets Rising, BSI Finds

By Don Leavitt
CW Staff

BETHESDA, Md. — Most DP organizations with large staffs expect to have training budgets equal to or larger than those they have had in the past and these budgets tend to fare as well as any others in the organization in the event of a cutback.

During the past year, average dollars spent for DP management and programmer training increased "significantly" while support for operations and for systems analysis and design "remained about the same," according to a report on the 1977-78 DP training survey conducted late last year by Brandon Systems Institute, Inc. (BSI).

More disturbing to institute personnel was the finding that on the average, the reporting organizations had only one full-time trainer for every 100 DP staff members. On an average, staffs included 273 people each.

Dollars budgeted for training bear the same relationship to total DP budget as the head count, BSI reported. Of the organizations answering this part of the survey, the average DP budget was $7.6 million while $113,400 was allocated to training.

The overall DP budgets ranged from $1,400 to $35 million and 10 out of the 71 organizations reporting said they had budgets of less than $1 million. The training budgets swung from $1,000 to $800,000 but on the average amounted to an "incredibly low" 1.5% of the reported average DP budget, a spokesman commented.

Most of the respondents said they send people to public vendor training courses and a substantial number indicated they also use outside vendors to teach their courses in the user's offices. Detailed rankings of courses actually utilized indicated considerable support for multimedia training provided by vendors such as Deltak and ASI.

When asked what they used as the primary consideration in making a decision whether to make or buy a training course, the organizations pointed first to the number of students to be trained, then to the uniqueness of the course, followed by the vendor's reputation, and finally, cost of vendor's training.

In questions related to who gets the training, rather than where it comes from, BSI gained solid evidence that user department personnel, and not just the DP technicians, are being offered courses. Only 27 out of the 97 respondents had no training for users.

More than half the organizations offered users introductory DP courses. Other subject areas mentioned included how to use application systems, project management and systems analysis, the report showed.

Systems analysts themselves are provided a formal training program in more than half the organizations covered by the survey. The program typically was a combination of internally developed and presented courses, audio-visual training and support from outside vendors.

Even more of the organizations said they had implemented structured design and programming and use a mix of methods to train the majority of their people in the new techniques.

Complete results — including user ratings of training vendors — and interpretations of the responses are available free from BSI as a service to the DP community, the spokesman noted from 4720 Montgomery Lane, Bethesda, Md. 20014.

'Speed' Programming Utility Runs on Wang Minicomputers

SEATTLE — Described as a programming utility developed to simplify system design, "dramatically" increase programmer productivity and "virtually eliminate debugging, documentation and maintenance problems," the Speed package for users of Wang Laboratories, Inc. minicomputers is available from The Office Manager, Inc.

The software is said to include a range of subroutines and programs that handle all file access, record blocking, master file maintenance, transaction entry and edit, inquiry, sorting and remote printing. With these tools, applications can be developed and installed quickly, a spokesman said.

Speed simplifies system design by providing a highly generalized framework that can be adapted to a specific application. Design is further simplified by allowing the use of fixed-length records of any size, he added.

The utility reduces programming time by as much as 80%, the spokesman claimed, noting that master file maintenance and transaction entry/edit programs are created without the user writing a single line of code. Report programs can be generated with "little more than a PRINT statement."

Although they are easy to create, the report programs can detect control breaks and print subtotals, manage page feeds, headings and subheadings. Subtotals and grand totals are accumulated and printed without further programmer effort, he added.

Speed is available on an initial-fee-plus-use basis. The one-time fee is $7,500. Coupled with use charges, that will bring the cost of the system to between $30,000 and $100,000 over a three-year period, the spokesman estimated.

The Office Manager is at 550 Industry Drive, P.O. Box 88067, Seattle, Wash. 98188.

Rider College Converts 'Pay-II' For Decsystem-10, 20 CPUs

LAWRENCEVILLE, N.J. — Personnel at the computer center of Rider College here have adapted the Pay-II payroll system from Wang Laboratories, Inc. to run on a Digital Equipment Corp. Decsystem-10. Since the Decsystem-20 is compatible with the larger "10," the converted package should run on the Decsystem-20 as well, a college spokesman acknowledged.

The converted code is said to make "complete use" of DEC's 6-bit Ascii and computational items, which run more efficiently on the Decsystem-10 than the original Wang coding, which used Ebcdic characters and "Comp-3" items.

Many data alignment problems had to be solved to complete this portion of the conversion, according to programmer Martin Katz, who worked on the project. The conversion also involved other problems such as record sizes too large for the Decsystem and tables too large for the DEC Cobol compiler, he added.

With the converted system, Rider can work with 15 earnings categories, 54 deductions, 499 miscellaneous fields and 100 user-defined codes, Katz said. It also supports a 48 character sort key, user-defined mnemonics, a labor cost file and "many other" Wang payroll options, he claimed.

A control file has been written to run the payroll system under the Decsystem-10 batch environment, Katz added.

Marketing of the Rider-developed package is being handled by Wang, where a spokesman said it should run on "small to mid-range" Decsystem-10s.

Highly modular, the software ranges from $18,500 for a stripped-down version to $105,000 for a complete system including personnel management, Wang said from One Industrial Ave., Lowell, Mass. 01851.

You're in good company with the Johnson Job Accounting Report System used by more than 1,000 D.P. Managers.

SUPPORTS
MVS–SVS–VS1–DOS/VS–POWER/VS–MVT–MFT–CICS/VS–IMS/VS–HASP
Tell us what areas you're interested in!

☐ Job Accounting
☐ Cost Distribution
☐ Software Performance
☐ Budget Control
☐ Thruput
☐ Customer Billing
☐ Resource Utilization
☐ Programmer Efficiency
☐ Job Scheduling

Send for your FREE 30 page System Characteristics Manual

Name ____________
Title ____________
Company ____________
Address ____________ City ____________
State ____________ Zip ____________ Phone (____) ____________
Computer ____________ Operating System ____________

C43

Johnson Systems, Inc.
8400 Westpark Drive
McLean, Virginia 22101
(703) 893-8700

Papers Sought

PHILADELPHIA — Management and evaluation of computer performance is the theme of this year's international conference of the Computer Measurement Group (CMG), and papers appropriate to that theme are invited, according to program chairman Linda S. Wright of Sun Information Services Co.

Papers for the early December conference may cover various topics including goals for performance evaluation departments, capacity planning, and workload forecasting.

Abstracts of proposed papers (in triplicate) are due May 1; completed papers (also three copies) are due July 1, Wright said from Sun's offics at 1608 Walnut St. (14/3GP), Philadelphia, Pa. 19103.

Software Users Get Bell Mail Drop

PELHAM HEIGHTS, N.Y. — Users now have a central point from which they can get information about software developed within the Bell Telephone system. But the establishment of a mail drop here — with the name Bell System Software — does not mean the company has a new organization to market the programs, according to a spokesman.

Bell's licensing office in North Carolina will still be handling the actual distribution of products, all internally developed, but the 'mailing address should simplify and therefore speed the processing of requests dealing with software, he said.

The packages now offered by Bell include the Unix operating system for Digital Equipment Corp. PDP-11s, the Machine-Aided Graphics for Illustration and Composition (Magic) system based on DEC XVMs and Decsystem-10s, the Program Affinity Grouping and Evaluation System (Pages) to reduce IBM OS/VS overhead and the QED text-editing systems for IBM or Honeywell mainframes.

All of the software comes from Bell "as is." There is no installation support and no automatic ongoing enhancement plans, the spokesman emphasized, although he admitted Unix at least has undergone considerable development since it was first released.

But that's word-of-mouth information and, in the words of the ad "introducing" the centralized information point, "word of mouth becomes word of print" for users writing to Bell System Software, 10 Pelham Parkway, Pelham Manor, N.Y. 10803.

Updated 'Dfast/VS' Aids DOS/VS Disk Management

HASBROUCK HEIGHTS, N.J. — Improved throughput and more real device independence are said to be the advantages provided IBM DOS/VS users through use of the Dfast/VS enhanced disk management system from Oxford Software Corp.

One important feature of the updated package, according to a spokesman, is its ability to balance arm movement within Public Space "in much the same way as partition balancing is achieved under DOS/VS."

Device independence is enhanced in the package by allowing the user to convert sequential disk files to tape, and vice versa, by supplying an appropriate control card. No recompilation or program modification is needed, the spokesman said.

The software also includes an ability to reblock disk files dynamically — for all disk types — to achieve a maximum logical blocking efficiency. The net result should be faster file transfers and a "significant reduction" in the number of accesses required, the spokesman asserted.

Dfast/VS uses standard JCL, requires no user main memory and is DOS/VS release-independent. The package ranges in cost from $5,625 or $203/mo on a one-year lease.

Oxford is at 174 Boulevard, Hasbrouck Heights, N.J. 07604.

Report Details Error Detection

WASHINGTON, D.C. — Sixty-seven techniques for detecting and preventing errors in DP systems are detailed in a report published by the National Bureau of Standards (NBS). The $2.20 publication provides designers and DP managers with the means of checking systems for correct performance, according to a bureau spokesman.

Performance Assurance and Data Integrity Practices describes current practices that can be tested and put into operation using commercially available hardware and software. It was prepared by Robert L. Patrick.

Within the soft-cover book, procedures are grouped into four categories. These include techniques to deal with data entry, programmer, operator and equipment errors on systems that process large amounts of data.

Although designated NBS Special Publication 500-24 by the bureau, the book is available as stock number 003-003-01879 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

WALK AWAY LEASES
for
IBM
3031
3032
3033
158, 168 and most other
Processors and Peripherals

- Lowest Lease Rates
- Contract Flexibility
- Simple Documentation

Call or Write

alanthus leasing company

Atlanta
404-955-7438

User Saves Four Man-Years

Management Technique Slashes Redefinition

BOSTON — In order to reduce the continuous redefinition of goals, responsibilities and schedules in its DP activity, Liberty Mutual Insurance Co. has implemented a technique known as "productivity management" to solve its systems management problems.

Developed by Keane Associates, Inc. in response to its own cost overruns on fixed-price systems development jobs, productivity management reportedly gets results for the user — on schedule in most cases — employing a six-step software management process:

- Define the job, in detail. By defining business and personal relationships in detail at the outset, specified results can be obtained on time and within budget.
- Get the right people involved. Personnel concerned with the system at every organizational level must be consulted, especially those who will use the system directly.
- Estimate time and costs. Fixing time and cost elements should only come after the job has been precisely defined and the project personnel identified.
- Set up an '80-hour' rule. No single task within the project should take longer than 80 hours, or two man-weeks, from start to finish.
- Set up change procedures. Establish a system for identifying, reviewing and measuring in advance the potential impact of proposed changes during the project implementation.
- Agree on acceptance criteria. Establish criteria for accepting the system at carefully staged intervals of the project, before the project begins.

According to Carl Bletzer, manager of systems and programs at Liberty Mutual, productivity management has served a very useful purpose for the company.

"What Keane gave us was a method by which we could stop and examine how we managed our people and projects. Productivity management is the guideline that put it all together for us," Bletzer said.

Techniques Adapted

To date, Liberty Mutual has adapted productivity management techniques in eight application areas, with three additional areas targeted for completion early this year. The company has trained one-third of its 900 DP personnel in the methodology of productivity management.

The company has applied the management technique in systems development in a number of areas, including its sales application group, property insurance group, worker's compensation, auto and general liability groups for personal and nonpersonal policyholders, accounting, budgeting and other financial applications and in its salary systems staff operation.

Liberty Mutual is also implementing productivity management in its personal life insurance group and in the development of an automated claims payment system and business policy and production auditing system, slated for completion early this year.

"Our goal was to provide detailed risk service policy information, including profit areas, coverage verification and billing/accounting reports to our statistical and marketing departments," Bletzer noted.

"So we analyzed the old system, identified the rough parameters of the project and went from A to Z using productivity management methodology. A major project like this uses more aspects of productivity management than a smaller one.

"After developing it, we tested the system three or four times over a 10-1/2 month period before going 'live' in May 1977 — right on schedule. The system now provides risk service information in more than a half-dozen formats," Bletzer added.

"It's been an outstanding success for us, one of the few major projects we've ever completed on schedule. Thanks to productivity management, we now have a more meaningful system," Bletzer concluded.

"We get better evaluation of requests since implementing this system," Wilfred Kurth II, assistant vice-president for DP said.

According to Kurth, the system has provided the company with better identification and allocation of resources. By carefully developing the first three steps, resources needed to complete the project can be clearly defined before heavy commitment begins.

Data base concepts and on-line teleprocessing techniques have enabled DP to replace many manual operations with CRT terminals at many of the 145 branch offices in the U.S. and Canada. Policy masterfiles on-line to either Boston or Burlington are available for coverage verification, claims registration, automated checkwriting, case closings, billing and accounting status reports and individual risk experience reviews.

"Like Keane, we employ a six-step approach that begins with the assumption that every DP activity shoud be treated as a separate project," Kurth noted. "Regardless of the size of the activity, elements of productivity management will apply.

"Our feasibility step should answer

(Continued on Page 26)

Wang builds a bigger giant killer.

Wang is hungrier than the giants. So, when we build a bigger computer, we build in better value. Wang's new 2200VS is the only virtual memory system at an entry level price under $50,000.

It's interactive. Responsive. 2.3 billion bytes of online storage. ANSI '74 COBOL, RPG II, BASIC and ASSEMBLER. IBM 360/370 instructions.

Multi-terminals; multiprocessing; multiprogramming. Software automatically adapts to system size. High, immediate programmer productivity.

2200VS is the first-time computer that protects your investment. The replacement computer for the yield you never got.

The remote computer to which you distribute 90% of the application's processing.

It's modular. Expandable without system conversion.

And, Wang works directly with you, the user. Hungry to know more? Mail this coupon to Wang Laboratories, Inc., Lowell, MA 01851. Or call (617) 851-4111.

Dear David:
☐ Send me information on the bigger giant-killer, Wang's 2200VS.

Name ____________
Title ____________
Company ____________
Address ____________
City ____________ State ______ Zip ______
Phone ____________

WANG

DP81/CW438

Use of 'FCS' Generalized

DALLAS — The Burroughs-oriented Release 4.2 of University Computing Co.'s (UCC) Financial Control System (FCS) software includes a range of enhancements that make it useful to commercial users in general, though the package was previously meant primarily for bankers.

Running on Burroughs mid-range CPUs — B2500s through B4800s — the FCS is a general ledger system, built around the system's own data base technology. The updated release supports a report writer, accounting and performance enhancements, a spokesman said.

The report writer is said to provide full access to the financial data base, digit selectivity and both horizontal and vertical math capabilities. Accounting logic now includes improved future-dated, accrual/reversal and standard journal entry features, improved fiscal year processing and easier file maintenance.

DP performance changes support compile-time options for dynamic media assignments for STOQUE (print spooling), tape, head-per-track disks and disk packs. These choices allow each user site to structure FCS to its own operating environment, UC noted.

It costs $40,000 under a 99-year lease.

Full payout lease/purchase plans are also available, the vendor said from 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

NCR 499 Users Get Support In Three Applications Areas

DAYTON, Ohio — In the past month and a half, NCR Corp. has introduced three packages to aid installations using the company's NCR 499 systems in diverse application areas.

The Road Commission System, for example, was designed to help road commissioners monitor and control construction projects. It requires a 24K processor, a 9.8M disk system, cassette handle and line printer.

The software is available now for $4,000, a spokesman noted.

The Rural Electric Cooperative Billing System can handle the needs of almost any one of the approximately 1,000 cooperatives located in the U.S. In addition to supporting the cooperatives' special requirements, the package also eases the calculation of fuel-cost adjustments, he said.

This package utilizes magnetic-striped ledger cards that can be processed by the 499 but can also be read by clerks when they are called upon to answer members' questions, the spokesman continued.

This software runs on a 16K 499 with the magnetic ledger feature, two tape cassette units and a line printer. It is available for $3,000.

NCR has also developed a package to prepare the program log and handle accounting for radio stations. The system is said to be capable of maintaining a list of commercials to be logged for up to a year.

As charges and receipts are posted to customer records or ledger cards, the 499 Radio Station System also prepares customer statements.

This system also requires a 16K processor, a magnetic ledger and two cassette handlers but it uses a continuous forms feeder. Cost of the software is $2,400.

Service Aids DP Gear Dealers

ANAHEIM, Calif. — Computer equipment dealers and brokers can access information about gear for sale or sought by others using a data base service developed by American Computer Referral (ACR) on the Tymnet data service network.

The service supports the interactive posting of entries to either the "Wants to Buy" or the "For Sale" file or the retrieval of information from either file. In developing this service, ACR itself is not a broker or dealer; it takes no commissions from any sales arranged through the listings. Cost to the user installation is limited to an annual subscription fee of $200 and charges for the time on-line to the net are billed at 60 cent/min, but subject to a $50/mo minimum.

ACR is at 423 S. Brookhurst St., Anaheim, Calif. 92804.

'Intercomm' Linked With 'Inquire' DBMS

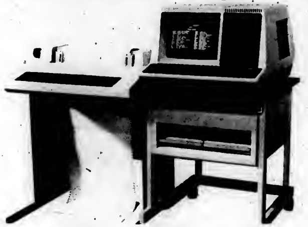
FALLS CHURCH, Va. — The interplay of data base management systems (DBMS) and data communications was reemphasized recently with the introduction of capabilities to interface Inquire from Infodata Systems, Inc. and the Intercomm teleprocessing monitor from Informatics, Inc.

The Inquire-Intercomm linkage is available from Infodata. It is an extension of interfacing that had previously allowed ties between Inquire and IBM's Time Sharing Option (TSO) or CICS and monitors from other independent software houses.

The Inquire DBMS allows IBM 360 and 370 users in batch or teleprocessing environments to create data bases, implement applications and inquire into and report from data bases without programming.

The full Inquire system costs $98,000, Infodata noted from 5205 Leesburg Pike, Falls Church, Va. 22041.

Introducing the lowest cost PDP-8 based business system



...in the business.

If you're an end user who finds programming easy, or a small systems house, here's an offer you can't refuse. Quodata Corporation is offering a complete PDP-8 based business system — with the very latest technology — for only $9,990.

That's $2,400 less than you'll find anywhere else.

And QDP78 is an outstanding system. It features QBOL, our own business-oriented language. QBOL is compatible with DEC's DIBOL, but it's better. One reason is that it runs under the more flexible OS/8 operating system. FORTRAN IV, BASIC, and SORT/8 are also part of the system.

The QDP78 system is comprised of the latest LSI video display computer, the VT-78, and includes a processor, 32K bytes of MOS memory, a large 24 line by 80 character video terminal with upper and lower case characters, DECwriter II printer, dual diskette drives, and a portable mini-desk.

We have a limited number available, so call now: Richard Prendergast, (203) 728-6777.

quodata
Specialists in DEC Software
196 TRUMBULL STREET · HARTFORD · CONNECTICUT 06103

NATIONAL —SPECIAL LEAR SIEGLER ISSUE—
INFORMER

April 3, 1978

GARRY STROHMEYER SAYS,

"THEY'RE PAYING ME TO KEEP QUIET."

The Dumb Terminal: A Success Story *Page 54*

★ ★ ★

Noted Psychic Sofia Pusnonska Predicts— Lear Siegler Will Dominate the NCC *Page 4*

★ ★ ★

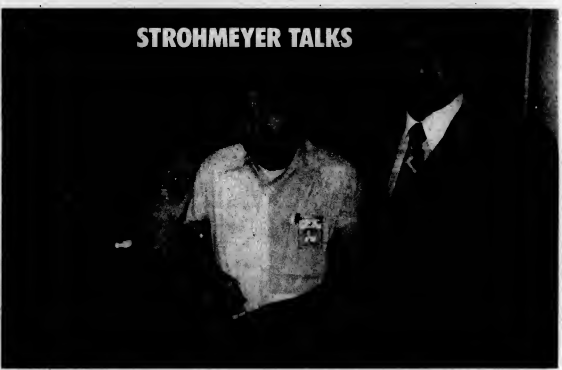
Rate Your Favorite Peripheral *Page 35*

★ ★ ★

Ballistic Printer and Dumb Terminal Sales Booming *Page 50*

★ ★ ★

Is Project X Trying to Create Artificial Intelligence? Has it Already Succeeded? *Page 26*



Garry Strohmeyer (center), seen here on his way to a high-level strategy meeting at LSI, is flanked by two bodyguards. Bodyguards were assigned to Strohmeyer after his talk with INFORMER reporter. INFORMER PHOTO

Garry Strohmeyer, an engineer closely involved in Lear Siegler's hush-hush Project X, told the INFORMER that Lear Siegler is "... paying me to keep quiet about Project X."

Reportedly initiated to dominate the National Computer Conference (NCC) through the development of incredible, new products, Project X remains a mystery.

The INFORMER, however, has recently heard rumors about Project X, one of Lear Siegler's most closely guarded secrets. Reports of new, smart terminals, intelligent terminals, fantastic new printers, and even a terminal controller have filtered down to us through various sources, most of whom prefer to remain anonymous.

Strohmeyer maintains that LSI would prefer not to disclose the details of Project X at this time, and has even approached him to ensure he maintains his silence. "All I can say is this," said Strohmeyer. "When this thing finally blows, the NCC will be ours." This cryptic statement was intriguing, but none of our enticements could persuade Strohmeyer to reveal anything further about Project X.

When questioned directly by the INFORMER concerning Project X, high-ranking authorities at Lear Siegler, Inc. headquarters remained strangely silent.

There are several hypotheses to be made concerning Project X, however, even in the absence of concrete information. When a company of Lear Siegler's stature initiates new product developments, we can readily expect earthshaking new approaches to materialize. And, with the NCC just around the corner, it seems safe to assume that Lear Siegler will stand the entire convention on its ear, so to speak, when it reveals the fruits of Project X's clandestine labor.

In addition to these assumptions, it has come to the attention of the INFORMER that several new scientific approaches have

(Page 7, column 2.)

Minicomputer Provides Support

On-Line Stock Market Data Streamlines Trades

Special to CW

NEW YORK — An advanced minicomputer system at The Equitable Life Assurance Society of the U.S. is providing on-line information support for both securities trading and portfolio management, along with automated paperwork processing of investment transactions in publicly traded securities.

The Trading and Custody Operations System (Tacos) was developed over the past two years with the aid of Index Systems, Inc. of Cambridge, Mass., a management consulting and systems development firm specializing in the investment industry.

"A major objective for Tacos was to improve the effectiveness and efficiency of the trading staff in processing securities transactions," according to John F. Dudley, vice-president responsible for all public market trading activity.

"We wanted to give our professional traders maximum accessibility of information to provide the quickest and most advantageous response to markets, such as broker indications on stocks, bids and offers on bonds and yield opportunities in the money market.

"Also, we recognized the need for automating the paperwork flow involved in such investment activities," Dudley said.

After determining its needs could not be met by a packaged software system or service bureau, The Equitable selected Index Systems to assist in the design and implementation of customized capabilities. The result was an integrated information system implemented on a Digital Equipment Corp. PDP-11/70. Six major subsystems serve specific requirements for trading in equities, bonds and money market instruments, equity and bond portfolio management and Securities Custody operations.

"The system is well conceived, well designed and highly effective because the users were intimately involved in specifying the nature and form of output, and its modular structure permits changes or additions of new programs with relative ease," according to Richard J. Murphy, director of investment research.

Apart from its potential for improved investment performance, the system is expected to provide significant benefits from higher personnel productivity and lower processing costs. In 1974, The Equitable estimated its transaction volume would double by 1980. Tacos will enable The Equitable to handle much of this volume without increasing its trading staff and will give portfolio managers more time for analyzing investment opportunities and handling more accounts.

Equity and Bond Trading

Equity traders now have a system to aid in the process of selecting brokers, and monitoring trading services. Broker indications are entered on-line and displays of these indications, as well as historical trades, can be called up either by broker or by issue.

Transaction data entered and validated by the computer includes codes that indicate reasons for executing the trade with a particular broker and the quality of the broker's performance on the trade. Also, all communications with brokers or are recorded by the system to satisfy regulatory requirements.

Buy and sell orders submitted to the trading desk from various portfolio managers are aggregated by Tacos which, upon execution by the traders, allocates stock to participating accounts and prints daily and weekly summaries of trading activity showing cumulative broker commissions.

For public fixed income traders, the system keeps track of current and past bids and offers, accessible both by issue and dealer. Historical trades can be similarly displayed, and year-to-date volume of business with each dealer is shown on daily and monthly printouts.

On a given day, The Equitable has between $600 million and $700 million invested in money market instruments. Before the introduction of Tacos, trade extensions (net amount payable and receivable) had to be computed manually for verification with the dealer or issuer. With Tacos, trade extensions are computed for all instruments traded.

In addition, the system tracks the complex internal constraints the money market traders have to observe regarding the amount of exposure to each issuer. On-line displays are available to show the day's trading by instrument type and maturity calendars for any time period of interest for any selected account.

The system also provides a dial-in interface to produce the authorization letter required by Equitable's custodial bank, which clears all money market transactions.

Custody Operations

Once an equity, fixed income or money market trader has entered transaction data into the minicomputer, it cannot be altered by another person. This assures a consistency of information to the custody area that was not posible when transaction tickets were transcribed manually.

Tacos provides transaction data to the custody area as well as to the company's securities accounting and daily valuation system. Confirmation approvals, including the nature of any errors, and trade settlements are recorded through the CRT terminals.

The system identifies and reports on exception situations, such as missing or erroneous confirmations, broker fails and overdue transfer operations. In addition it tracks all movements of securities within The Equitable or to outside agencies.

Portfolio Management

Through the minicomputer, The Equitable's portfolio managers have access to a broad range of information. Current status of holdings in any account can be displayed, including market value as of the previous day's close, percent of portfolio, income and yield. Holdings may be listed either by industry, or in order of market value. With other commands Tacos will show:

- Distribution of a single issue among all accounts, including amount held, market value and percent of portfolio.
- A profile of any equity portfolio by divident yields or price-earnings ratios.
- Percentage of portfolio invested in stocks in each industry sector or according to another stock classification established by Equitable.
- A display listing each account's holdings in each industry sector with comparison of industry representation in each portfolio to the aggregate representation in all portfolios or to their representation in portfolios with similar investment objectives.
- Breakdowns of bond portfolios according to coupon, quality and maturity.

Forum to Cover Data Bases

CHICAGO — Management of data base systems is the theme of a conference to be presented by the American Institute of Industrial Engineers at the Ambassador West Hotel here next Monday and Tuesday.

Speakers at the conference will include representatives of International Harvester Corp., RCA's David Sarnoff Research Laboratories and Northwest Industries. The workshop will be conducted by Leo J. Cohen, president of Performance Development Corp. and author of numerous articles and books on data base systems.

APL CONSULTING * EDUCATION * SOFTWARE

For all your in-house needs.

(416) 868-6013

Numetrix Limited
3 Church St., Suite 600
Toronto, Ontario M5E 1M2

Upgrade to IBM 6250 BPI tape drives now!

SAVE IBM RENT — ELIMINATE DOWN-TIME
caused by field conversion

We will purchase your IBM 800/1600 BPI drives now & install 3420-4/3420-6 drives immediately from inventory

Call Nick DiBari
312-698-3000
or your nearest Comdisco office

COMDISCO

EDP AUDITORS ASSOCIATION

6th INTERNATIONAL CONFERENCE

HYATT-REGENCY DEARBORN, MI.
JUNE 19-21, 1978

TOPICS INCLUDE AUDITING APPLICATIONS, ON-LINE SYSTEMS, DATA BASE, EFTS, SECURITY/PRIVACY.

FOR MORE INFORMATION CONTACT:

EDPAA 1978 CONFERENCE
P.O. BOX 61
Sterling Heights, Michigan 48078
Attention: Mr. Baker

PLEASE PRINT

NAME ____________________

COMPANY ____________________

ADDRESS ____________________

SOFTWARE BROKERS

Software commission salesmen or rep organizations to sell marketing models all territories USA.

Write W.F. Slade
The Forte Warren Corporation
280 Lincoln St.
Boston, MA 02134

MEANS
System/3 Leasing For A Lot Less

Save up to 60% on your installed or on-order System/3 or other computer system with our new purchase and leaseback program—ELEX/3.

The Equipment Lease Exchange Inc
[illegible]
MEDFORD, NEW JERSEY [illegible]
609/654-1100

AKD (402) 392-2606

VOLUME DATA ENTRY SERVICES . . .
TAPE OR CARDS
"QUALITY AT A LOWER COST"
AMERICAN KEYDATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

Com-plete. The first TP System with sales of over $1,000,000 in its first year.

Why is Com-plete an overnight success? It's CICS, IMS/DC, TSO, and more...all in one easy-to-use package.

No one else puts it all together:

- Terminal-independent mapping.
- Message switching.
- Remote job entry and retrieval.
- Interactive program development.
- Data base management.
- File management.
- Multi-threading.
- Interactive utilities.
- Performance tuning.
- Interactive program debugging.
- Full user accounting through SMF.
- Security.
- Recovery management...

and more.

There's only one way to get all this in a TP System without overloading your computer and your people. It's Com-plete, the complete communications system from Software ag...and recent winner of International Computer Programs' "Million-in-One" Award.

Here's what Com-plete users say:

"Compared to all other TP Systems, Com-plete uses less core, gives faster response times, improves thru-put, and is easier to use. We replaced our on-line program development system with Com-plete and got improved interactive programming plus on-line transaction processing and more for much less overhead. Furthermore, support from Software ag is the best in the industry."

Gordon Cochrane
Manager, Information Services
R.T. French Company

"We signed a contract to design and deliver a theater and stadium seat reservation system in three months. The system will start with 50 on-line terminals and soon grow to 200. Without Com-plete, it would be impossible to meet this schedule."

Omar Alvarado
Director
Teleinformatica de Mexico

The future is here today with Com-plete. Together with Adabas, Software ag's DBMS, you can have the most powerful DB/DC System in the world, on your 360/370 or compatible computer.

To step into the future, mail the coupon or call our nearest office today.

Corporate Headquarters:
Reston, Virginia (703) 860-5050.
New York (212) 682-2780.
Miami (305) 989-4814.
Houston (713) 444-2651.
Detroit (313) 354-0424.
San Francisco (415) 332-3890.
Los Angeles (714) 494-8410.
Cambridge, Ontario (519) 653-6142.
Mexico City (905) 550-8033.

software ag
OF NORTH AMERICA, INC.

Software ag of North America
Reston International Center, 11800 Sunrise Valley Drive
Reston, Virginia 22091

☐ I'd like Com-plete information.
☐ Please send information on Adabas.
☐ Let's arrange a presentation.

Name________________ Company name________________
Street________________ City________________
State________ Zip________ Phone________________
Type of computer________________ Operating system________________

Worldwide support

Member SIA Software Industry Association

Macro Edits Eased

DALLAS — A macro edit and verification program for IBM-oriented system programmers, UCC-50 from University Computing Co. (UCC) eases the creation, modification and desk-checking of new or existing macro instructions, a spokesman said.

The package can help train programmers in macro coding and modification and allows macro debugging even before the using program has been compiled, he added.

Since the user seldom if ever works directly with the internals of the macro procedure, it is especially important that it be correct when he invokes the facility with a CALL from the application program, the spokesman explained.

UCC-50 reads macro source code prior to execution, assigns sequence numbers to the source statement, provides a cross-reference of sequence symbols to macro source statements and warns the developer when a variable used in a statement lacks a definition.

This assembly language program runs in batch mode under IBM OS or OS/VS without operating system modification. Its execution requires about 60K bytes of memory.

Sold as a user-installable package, UCC-50 with user's guide costs $1,200 from UCC, 8303 Elmbrook, Dallas, Texas 75247.

Help Asked for Data Inventory

AMHERST, N.Y.— The International Geographical Union Commission on Geographical Data Sensing and Processing is seeking information about programs or cartographic data sets that could be included in an updated and extended *Inventory of Computer Software for Spatial Data Handling,* to be published late this summer.

Sponsored by the U.S. Geological Survey, the listing should reduce the redundancy that now exists because technicians working in various disciplines are not aware of work being done elsewhere, according to Prof. Duane F. Marble, who is coordinating the development of inventory.

Marble is seeking data on any relevant software, whether individual functions, complete systems or prepared data bases. He is interested in listing commercial products as well as those not now on the market.

To ease preparation of the book, Marble has a standardized form he will be glad to give anyone who asks. He would like to have all entries for the 1978 inventory returned to him by July 1.

Marble is at the Geographic Information Systems Laboratory, State University of New York at Buffalo, Amherst, N.Y. 14260.

Data Base Covers Bonds

WALTHAM, Mass. — A data base providing daily on-line municipal bond evaluations is available through the time-sharing facilities of Interactive Data Corp.

The data base covers more than 1.1 million bonds and some 40,000 issues and contains 20 items of such descriptive information as call data, ratings and maturity dates, the vendor said.

Evaluations are generated by a formula-yield matrix system that calculates yield curves based on market ratings against maturity dates and coupon information. The data base is comprised of daily evaluations beginning July 12, 1976.

With service available internationally, Interactive Data Corp. is headquartered at 486 Totten Pond Road, Waltham, Mass. 02154.

User Slashes Redefinitions

(Continued from Page 21)

three fundamental questions. Technically, can the job be done? Economically, should it be done? And operationally, will the finished job satisfy the request?

"This stage is crucial," he pointed out. "No matter what you think the outcome is supposed to look like, unless you firmly implant at the outset what you're going to accomplish, the results aren't going to be what you wanted."

The second step formalizes the project, identifies leaders and teams, assigns specific target dates, sets progress reporting techniques, determines educational needs and documents the entire system via the Hipo method.

A written "contract" specifying project details is then drawn up and signed by all parties before the project proceeds further.

The third step in Liberty Mutual's revised program is "detail, including unit and systems testing plans, initiation of run books, complete conversion plans and whatever detail is necessary to initiate programming on a well-defined schedule.

"Programming and control testing" develops and tests the program designed during detail analysis, within a controlled environment, to ensure program accuracy and to provide complete documentation.

"In the fifth step, called 'systems test,' " Kurth explained, "we check the total development product, regardless of the project size, under conditions that simulate a production environment. We also insist on user acceptance of the system test, which is formalized in a written document."

The final step, "conversion and implementation," puts the system into operation so that it functions on a scheduled cycle.

DEC® Data System Owners
Need new reports within minutes?
DEC® OEM's
Having trouble speaking English?

SYMBOLIC SYSTEMS® INC.
(DEC's first and foremost business OEM)

***PRINT IV*™**
s user-orientsd, qusry type report writer

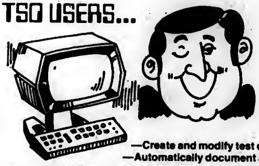
To print s report, simply:

- select data desired
- select order desired
- enter selection criteria and required totals
- watch report appear on printer

No programming skills requiredi
License price includes 1-yr. warranty
For tree demo snd further information
call, writa or teiax

FRANK J. PONZIO, JR.
SYMBOLIC® SYSTEMS
25 Chatham Road Summit, NJ 07901
(201) 277-6100/Telex No. 13-6476

TSO USERS...



—Create and modify test data
—Automatically document JCL

Video Programming tools (VIP) extends and anhances your use of TSO to these particular areas of need.

Test data is easily generated and modified by even a novice user through an interactive command processor running in foreground. It is also a simple task for maintenance programmers to select records from live files and modify fields to recreata conditions suspect in program failure. Incidently, ViP understands the need to input HEX, binary and packed data.

More comprehensive test conditions are easily produced and overall program test time significantly reduced (aspecially compared to the trial and arror of batch tasting or the awkwardness of working with toreign languages or processors).

JCL documentation is automatically dona and always current with VIP's flowchart generator. Each step appears on an 8½" X 11" paper for easy inclusion in documentation manuals.

For samples documentation and more information, write or call

DASD CORPORATION
National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/298-5005

DASD CORPORATION

Business Systems

DISTRIBUTOR OPPORTUNITY

Micro Business Applications, Inc., manufacturers of the MICRON ™ computer systems is actively seeking distributorship candidates with prior successful experience in supporting the data processing needa of the business community.

MICRON systems are the affordable answer to the data processing requirements of small to medium-sized companiss. The microprocessor based hard-disc system was developed by MBA to provide the first time computer user with a usable solution to today's problems, while expandable to meet tomorrow's requirements.

For further information, please call or write: Warren Blossom, Vice President/Marketing.

Micro Business Applications

11158 Sorrento Valley Rd.
San Diego, Ca. 92121
(714) 453-8884

DISTRIBUTORS

Wordplex Corporation is a leader in the rapidly expanding word processing industry. We offer the broadest and most advanced range of products available—from a single station screen-based system to shared logic systems with as many as 32 word stations and massive storage.

In 1976, following a 3 year development program, the Wordplex products were first announced in Europe. Success has been outstanding with the result that Wordplex distributors now occupy prominent positions in all major European and Australian word processing markets.

We are now seeking organizations with experience in distributing computing systems in Canada and the following areas of the U.S.—

Alsbama
Alaska
Albsny & Builalo, NY
Arizona
Arkansas
Hawali
Idaho
Indianapolia, IN
Kentucky
Louisiana
Miami, Florida
Mississippi
Montana
Nevsda
New Hsmpshire
New Mexico
North Carolina
North Dakots
Oregon
South Dakota
Tennessee
Utah
Vermont
West Virginia
Wyoming

Contact Geoff Groom
31829 W. La Tienda Dr., Westfake Village, CA 91361
(213) 889-4455

wordplex

As Three Terminals Debut

IBM Introduces RJE Protocol for SNA

By Ronald A. Frank
CW Staff

WHITE PLAINS, N.Y. — IBM has introduced a half-duplex protocol for remote job entry use that operates under its Systems Network Architecture (SNA) and reportedly allows multileaving of jobstreams on the 3776 and 3777 terminals.

The protocol capability was announced as part of an equipment upgrade that included the introduction of the models 3 and 4 of the 3776 terminal system and the Model 3 of the 3777 terminal system.

The Multiple Logical Unit (MLU) protocol operates under control of an RJE subsystem in the SNA host CPU. MLU interleaves up to six individual jobstreams to and from the host in half-duplex mode, according to an IBM spokesman who noted MLU is an SNA-only protocol.

Control of Six Jobs

MLU operates with Vtam, DOS/VS Power, OS/VS1 RES, OS/VS2 JES2, OS/-VS2 JES 3 and NCP/VS Release 5. The terminal operator has control of up to six concurrent jobs and the multiple logical operation allows on-line jobs to be initiated any time an SNA session is available for transmission, the spokesman said.

The terminals also allow attachment of one magnetic tape unit. Control of the tape I/O can be assigned to an independent host SNA session or the terminal can be used for local I/O operations.

Message spooling and operator prompting can be accomplished for host system messages via the standard console display, IBM said.

The 3776 Model 3 operates at speeds up to 300 line/min, the Model 4 up to 400 line/-min and the 3777 Model 3 up to 1,200 line/-min.

The 3776 Model 3 is available under a two-year lease for $750/mo or can be rented for $881/mo. Its purchase price is $30,000. The Model 4 can be leased for $825/mo, rented for $969/mo or purchased for $33,000.

The 3777 Model 3 can be leased for $520/mo, rented for $611/mo or purchased for $20,800.

A representative 3776 Model 3 configuration, which includes a printer, 2502 card reader and line attachment features, can be purchased for $42,000; the Model 4 for $45,000.

The purchase price of a representative 3777 Model 3 including a 2502 card reader, a 3203 high-speed printer and 3411 magnetic tape unit is $97,960.

Under a two-year agreement, the 3776 Model 3 configuration can be leased for $1,033/mo or rented for $1,190/mo; the 3776 Model 4 configuration can be leased for $1,108/mo or rented for $1,278/mo; the 3777 Model 3 configuration can be leased for $2,494/mo or rented for $2,886/mo.

First customer shipments of the terminals are scheduled to begin in the fourth quarter.

Nova, Eclipse Line Multiplexer Mixes Controllers on One Board

WESTBORO, Mass. — Data General Corp. has introduced a universal line multiplexer that combines a four-line asynchronous controller with a single-line synchronous controller on a single circuit board. This communications subsystem, said to save both cost and space over multiboard designs, interfaces asynchronous terminals as well as a synchronous line to a host CPU.

The ULM-5 universal line multiplexer occupies a single slot in a DG Nova or Eclipse chassis. It is software-compatible with DG's ALM series asynchronous line multiplexers and is supported by DG operating systems and software, according to a spokesman.

The subsystem was designed for small and medium-sized systems with on-line terminals and as a link to a host system. It features full modem control, including auto answer, and provides a cyclic redundancy check (CRC) to assist system software in implementing various synchronous line protocols, such as IBM's Bisync mode, the spokesman said.

Each asynchronous interface can operate at selectable line speeds to 9,600 bit/sec either full- or half-duplex. Line interfaces are RS-232C- and CCITT V.24-compatible, and the asynchronous controllers are also EIA or 20mA current-loop compatible, he added.

Software support includes standard DG operating systems (AOS, RDOS, RTOS and its disk operating system). Communications software includes the Communications Access Manager (CAM) under RDOS, which provides system support for standard Ascii and Bisync protocols.

RJE80 and Hasp II workstation emulators permit interfacing to remote DG or IBM-compatible host processors through emulation of 2780/3780 or Hasp II workstations, the company said.

The ULM-5 is available in three forms: as the Model 4243 four-line asynchonous and single-line synchronous controller on a single board for $2,700 or on separate boards as the Model 4241 four-line asynchronous controller for $1,400 and the Model 4242 single-line synchronous controller, which also costs $1,400. DG is at Rt. 9, Westboro, Mass. 01581.

Bell-Type Modem All-CMOS

PALO ALTO, Calif. — Prentice Corp. has introduced a Bell 202-compatible, half- and full-duplex modem with all-CMOS circuitry and built-in diagnostics.

The AM-202 interfaces with both data communications terminals and multiplexers and permits nonsynchronous transmission of data over common carrier leased lines, the company said.

An advantage of the AM-202 over the Bell 202T model is said to be its built-in diagnostics. As an installation and troubleshooting aid, the AM-202's diagnostics include LED status indicator lamps and digital and analog loopback switches.

A remote digital loopback feature allows users to automatically control an unattended remote modem and use it to loop back at the remote digital interface for end-to-end network evaluation, a spokesman noted.

The card version of the AM-202 sells for $325. A stand-alone version is priced at $440. Prentice is at 795 San Antonio Road, Palo Alto, Calif. 94303.

CLIP AND RETURN FOR FAST RESPONSE

save . . . buy a coupler/terminal from the modem outfitter

A compact lightweight Series 150 coupler can be combined with popular terminals to provide a significant savings . . .

☐ LA-36 DECwriter II with 150A2-14B $1637

☐ TI 743 with 150A2-12B $1437

☐ Teletype 43 with 150A2-14C $1287

☐ Teletype 33KSR with 150A2-11D $1047

☐ Acoustic Couplers ☐ Modems ☐ Multiplexers ☐ Floppy Discs

Check items of interest and return to us for more information

COMDATA

8115 Monticello
Skokie, Il 60076
312/677-3900

New York
212/[illegible]

Los Angeles
213/624-0550

member of IDCMA

name
company
street
city state zip
telephone ext.

THE $99.00 MODEM*

You're suspicious aren't you? OK, we confess. Our M-1 asynchronous short haul modem won't do what a lot of other modems will do.

However, the M-1 will solve many of your local or in-house communication problems up to 10 miles or 9600 bps. And because you aren't paying for a lot of options and capabilities that you don't need in those situations, you'll be saving a bundle of money.

Interested? Write or call us now for a data sheet and complete price information.

bo-sherrel co.
36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

*100 Quantity

THANKS, HAZELTINE!

As operating management, we appreciate how you've helped us control costs, stay competitive, and increase our profitability!

A BUSINESS PROPOSITION FROM HAZELTINE CONCERNING POLLING NETWORKS BUILT AROUND BURROUGHS, HONEYWELL OR UNIVAC COMPUTERS:

SAVE AS MUCH AS 50% WITH

Hazeltine modular one/polling

Hazeltine—A World Leader in Information Electronics for more than a half-century.

Hazeltine Corp, Computer Terminal Equipment, Greenlawn, NY 11740 (516) 549-8800 Telex 96-1435

Wisconsin Control Center Keeps Network's Customers Up for 99.5% of the Time

MILWAUKEE — Blue Cross of Wisconsin has developed a teleprocessing network diagnostic system with testing capabilities that has reportedly improved the delivery of services to computer customers and increased the availability of teleprocessing time from 97% to 99.5%.

This increase has also brought a 4.3% improvement in end-user availability from 92.7% to 97%, according to Dan Reising, Blue Cross telecommunications supervisor, who designed and built the system.

The system has testing capabilities beyond the normal range of terminal customer engineers and common carrier repairmen, Reising said. The control center enables Blue Cross network coordinators to diagnose and expedite repairs on all data communications circuits and terminals. At the same time, it maintains control of problems and their corrections with the least interruption of service to customers.

Reising said problems are resolved by:

- Faster recognition and diagnosis of the problem.
- Prompt identification of the correct vendor in 99.5% of all cases.
- Improved relations with vendors resulting from accurate dispatching.
- Control through effective, timely follow-up of problems and their solutions.
- Retesting capabilities following vendor repairs.
- Problem-tracking capabilities that lead to more effective preventive maintenance.
- Increased customer and vendor awareness of the system's capabilities.

"A most important benefit of the system," Reising explained, "is our ability to restore service to our customers without unnecessary delays. Once a problem is diagnosed, we can get the customer back on-line, and then we can correct the problem. This gives us greater credibility with our customers and vendors and improves our relationships with both groups."

The network control center eliminates confusion and lost trouble reports, he said, noting it also reduces the amount of line and terminal downtime while controlling teleprocessing equipment and software-related difficulties.

Problems can be detected and diagnosd from a central site, often before the user is aware of a malfunction. Preventive maintenance is a key element of the service and regularly scheduled testing programs detect degradation before service is affected.

The preventive maintenance system is a series of benchmark readings of the line parameters. Tests are made on functioning circuits. Weekly checks are conducted during off-hours, and the readings are compared with the benchmarks. If significant degradation is apparent, steps are taken to control the situation:

"The whole idea of network control is to keep customer involvement to a minimum," Reising said. "We are continually working with the vendor to identify and correct equipment problems in order to improve service to our teleprocessing customers."

The Blue Cross communications network control center can control and correct those situations found to be most annoying to customers and vendors, Reising added. As an example, most line-related problems clear five to 10 minutes before a call can be handled by the common carrier. With most systems, there is no way of knowing if a problem is rectified until the common carrier gives clearance; this wastes hours of user availability.

But the Blue Cross system monitors the line and brings it up immediately after the problem has been resolved. There is no waiting for clearance.

Another problem results from unnecessary service calls. Approximately 21% of all service requests can be totally eliminated with a thorough diagnostics program, Reising said.

Trouble related to simple malfunctions (a loose or disconnected cable) or human error (a switch in the wrong position) can be resolved by phone with the operator making simple equipment checks. When phone company or vendor service calls are made in response to such problems, several hours or even an entire day of input time and the technician's time are wasted.

The Blue Cross system diagnoses the problem immediately. The proper vendor is dispatched without delay or error in determining the nature of the problem.

Since the installation of the network in February of 1977, delivery of service to end users has improved by 4.3% to 97%, Reising said. Besides Blue Cross of Wisconsin, its primary customer, the center serves two corporations and 20 hospitals. It maintains 315 terminals on 42 common carrier data links and has a current maximum capacity of 96 data links.

The communications control center has a Bradley V-F Line Analyzer capable of diagnosing a problem in a data link within less than five minutes of the reported trouble. The line analyzer provides an audiovisual means of measuring gain and phase hits, amplitude and phase jitter, harmonic distortion, impulse and steady state noise, frequency deviation and most parameters that can degrade performance.

The most frequently used tool in the network is a Spectron Corp. Model 601 Datascope. It facilitates the monitoring of computer input and output to determine the sequence of events leading to a problem. It also records and plays back the data for later analysis.

There is also a Buffered Data Simulator to simulate the host system and exercise the terminal equipment.

Other network equipment includes level meters, a Milgo 220 test set and an oscilloscope. They operate through a Cooke Dynam-Patch Facility to diagnose problems without interfering with ongoing teleprocessing.

By combining these tools with troubleshooting techniques, network coordinators can pinpoint a failing component in 99.5% of all instances, Reising said.

GA Announces 440 Gains Languages, 3780 Ability

ANAHEIM, Calif. — General Automation, Inc. has announced several enhancements to its 440 Data Series family of commercial systems, including the addition of a Fortran IV and Commercial Fortran (Comfort) programming capability, the extension of Cobol to include Level 2 programming features and the addition of IBM 2780 communications capability for access to host computer systems in a network.

Suggested Applications

A company spokesman explained that the extended Cobol is useful for commercial applications, that extended Fortran is appropriate for industrial control, engineering and scientific calculation environment and that Comfort is appropriate for applications involving commercial tasks.

All 440 systems are offered with Control III real-time foreground/background operating systems, the MTS multiterminal time-sharing executive and FMS Isam file manager, in addition to one of the language processors most appropriate for the systems, the spokesman said.

A full complement of peripherals can also be specified to match system power with user requirements. These options include expandable disk storage in 10M- or 80M-byte increments, 200- or 600 line/min line printers, 400- or 1,000 card/min card readers and up to 16 current-loop RS-232 or CRT terminals.

A typical four-terminal system, including one language processor, a 128K-byte 16/440 minicomputer, a 10M-byte disk, a 200 line/min printer, all system software, 2780 communications and six weeks of intensive training costs less than $44,000, according to the company spokesman.

GA is at 1055 S. East St., Anaheim, Calif. 92803.

Diebold Brings Out ATM

CANTON, Ohio — Diebold, Inc. has announced the Total Automatic Banking System (Tabs), an automated teller machine (ATM) that can reportedly facilitate up to 20 routine banking transactions depending on the setting of the system's minicomputer.

A 15-key, sealed solid-state keyboard from Micro Switch, a division of Honeywell, permits direct communications with the automatic banking system 24 hours a day and on weekends.

Micro Switch electromechanical switches control paper advance, sense paper quantity, interlock various functions and note the position of the vandal shield, according to a company spokesman.

The bank customer's personal identification number (PIN) is not printed or encoded on the identification card and does not show up on the CRT during the transaction, the firm noted.

The system includes a Bunker-Ramo Corp. programmable control unit minicomputer, but can alternatively interface with other controllers, according to the company.

The system includes hardware, software and both systems and maintenance support. A typical system might have 10 terminals at an average price of $25,000 each and a controller priced at $30,000, making an average total of $280,000.

Diebold is located at 818 Mulberry Road S.E., Canton, Ohio 44711.

ALD Features 'Zero Downtime'

SANTA CLARA, Calif. — A "Zero Downtime" asynchronous line driver (ALD) has been announced by Ven-Tel, Inc.

The Ven-Tel ALD is comprised of a single unit housing two asynchronous line drivers. While one ALD is in operation, the other remains in a ready state as an on-site backup unit, according to the firm.

Specific Features

The "Zero Downtime" option is part of Ven-Tel's latest product line that offers four different stand-alone or rack-mounted ALDs, all conforming to Bell Specification 43401 and utilizing either an EIA RS-232C or 20 mA interface. Specific features of the limited distance line driver include up to 9,600 bit/sec asynchronous transmission, two-wire half-duplex or four-wire full-duplex, point-to-point or multidrop and LED performance indicators, a spokesman said.

Price for the stand-alone version of the ALD is $320 and for the rack-mounted card-only version the price is $235.

The firm is located at 2360 Walsh Ave., Santa Clara, Calif. 95050.

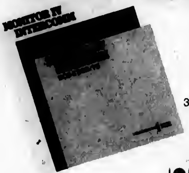
'We'll Have Your Report for You Shortly . . . We're Having a Little Trouble Capturing the Data.'

FEW THINGS IN LIFE ARE PERFECT

But one of our teleprocessing monitors is... We know our MINICOMM is the best teleprocessing monitor around for small 360/370 DOS and DOS/VS system users. We wouldn't have dared to claim it was perfect. But our *users* did! **They gave it a *perfect 4.0* rating for "overall satisfaction" in the *1977 Datapro software survey. Of the 199 packages evaluated in the survey, only 2 others achieved this honor* (neither has anything to do with teleprocessing).** MINICOMM also scored a perfect 4.0 in "ease of use" and a 3.9 in "throughput/efficiency"! We won't try to recite all of MINICOMM's unique advantages here. We'll just say that if you're going to be a first time user or are unhappy with your present monitor—and have at least 24K of core and a day or two for installation and training—we can have you on-line and loving every easy minute of it.

So ask yourself: when perfection is so close at hand, does it make sense to settle for less?

Our other two monitors also draw high praise from users. Get the facts on our entire MONITOR IV family of teleprocessing monitors. Today...call or write! (calling is faster!) Brochures on products filling your precise requirements will be in the mail the same day.



BETACOMM: Designed for the medium to large size 360/370 DOS/VS user with multithread, multitask requirements.

INTERCOMM: The most advanced general purpose on-line TP monitor system for 360/370 OS and VS environments.

MONITOR IV

informatics inc Software Products

World's Leading Independent Supplier of Software Products

Member SIA Software Industry Association

21050 Vanowen St., Canoga Park, Calif. 91304 (213) 887-9121

New York (212) 481-6800 . Washington (703) 821-5900 Chicago (312) 298-9300 Los Angeles (213) 822-3552

Backs 3270 CRTs

IUP From IBM Supports Health Care Facilities

WHITE PLAINS, N.Y. — IBM has announced a program that enables a hospital to collect, store and communicate patient care information through the use of terminals linked to a central IBM 370 computer.

The record management program, called the Health Care Support/DL/I Patient Care System, was developed by Duke University Medical Center in Durham, N.C.

The Installed User Program (IUP) is a hospital wide information system that provides a communications link between the admissions office, nursing stations, ancillary departments, accounting and the medical records department, according to a spokesman.

The Health Care System was designed to operate on a system that includes the following components. A 370 capable of supporting OS/VS, CICS/OS/VS, IMS/VS and appropriate application programs.

- An IBM 3270 terminal; control units and CRTs must support at least a 1,920-byte display; any model printer is supported.
- An 80-column card reader.
- A 132-character line printer.
- Sufficient direct access storage to meet system and data base requirements.
- At least one tape drive.

The IUP is written in PL/I and Assembler language. The prerequisite programs require Cobol OS/VS.

The IUP is a user-driven system through which the service departments and nursing stations can manage patient records. This is accomplished by entering doctors' orders through CRTs at the nursing stations, the firm said.

The orders are transmitted to the appropriate ancillary departments and are added to the patient's data base record. The ancillary departments have the ability to display and/or print worklists and to enter results.

Results can then be sent back to the nursing station in hard-copy form to become a part of the patient's chart. The data becomes part of the patient's data base record and is available for inquiry through a CRT.

Cumulative summaries may also be produced, according to the spokesman.

Charges for these services are automatically collected and made available to the accounting system. Upon patient discharge, medical record abstracts are prepared.

The monthly charge for the IUP is $2,900, with charges waived after 24 consecutive payments.

Teletype 40 Gets Link to CPUs And Terminals

MIAMI LAKES, Fla. — The C-40 and D-40 interface boards from Innovative Electronic Systems, Inc. reportedly allow the 300 line/min Teletype Corp. Model 40 teleprinter to connect to a host computer or terminal that offers a Centronics Data Computer Corp. or Dataproducts Corp. interface.

Complete hardware/software transparency permits plug-to-plug compatibility without system modifications, an Innovative spokesman said. The C-40 allows for the replacement of any Centronics printer; the D-40 provides for Dataproducts replacement.

Self-Contained Board

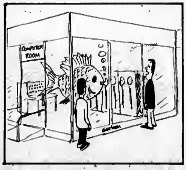
Each board is self contained and does not require external power when mounted within the printer cabinet since power is derived from the printer, the spokesman noted. The board may also be mounted inside the host system, allowing computer/-printer separation via two-wire pairs up to 2,000 feet.

Standard features include a 160-character first-in/first-out (Fifo) buffer permitting data transfers up to 250 kHz, field-selectable control character code conversion, parity selection, extended Ascii and variable motor time out after last character received.

Optional features are bell/alarm, elapsed time indicator, manual select switch (on/off line) and a programmable code converter for nonstandard character sets.

Print speeds up to 500 line/min may be achieved when using the IBM 1403-equivalent 48-character set, the company said.

Nationwide service is available for the C-40, priced at $795. Innovative Electronic Systems is at 15200 N.W. 60th Ave., Miami Lakes, Fla. 33014.



'Well, It Could Be the Night Operator's Idea of a Joke . . .'

dc

SIM-14.™

It'll give your 1401* programs a new lease on life.

• IBM 303X, AMDAHL, CDC, ITEL users...SIM-14 means *no re-programming!*

• IBM 360/370 users...SIM-14 means running multiple programs *simultaneously!*

If your new whizzer has made your 1400 series program old before its time, our simulator can give it instant new life with features like...

...a self-relocating problem program that's completely interruptible; no hardware restrictions other than decimal arithmetic set; no control storage or micro codes; full tape and disk support; support for 1400 utilities and sort replacements included...

And more. Enough, in fact, to fill its own manual. To get your copy—*and to find out how "cheep" SIM-14 can be*—call your nearest Dearborn office.

***Includes 1440 and 1460 programs**

dc | **dearborn** computer company | dealer-IBM computers
systems software
leasing

1460 renaissance drive/suite 400/park ridge, illinois 60068 (chicago)/(312) 827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788 • dallas (214) 748-5899
member, CLA; ADAPSO; SIA

Key-to-Disk Net Tracks Aircraft Engine Parts

SOUTHINGTON, Conn. — At any time, 10,000 to 15,000 jet engine parts are tracked in Pratt & Whitney Aircraft Service Center's work-in-process system — with a recently installed terminal system.

According to Leo Croteau, manager of DP for the service center operation, "we wanted a sophisticated data entry system, with the capability of communicating in a Model 20 multileaving mode to both our IBM 370/168s located at the Pratt & Whitney E. Hartford facilities."

A Data 100 Corp. Keybatch system was acquired to replace an overworked keypunch facility that was inadequate for processing the volume of data required. In addition, the keypunch machines had taxed the work force by forcing operators to work overtime to keep up with the volumes of data.

The terminal system allows the service center to enter parts data more efficiently. Upon engine disassembly or receipt of parts from customers, one of the operators keys into the five million-byte system repair data that includes part number and name, sequence of repair operations, target date, priority code, estimated hours to repair and type of modification to be incorporated.

"It took about five weeks to process nearly 50,000 records," Croteau explained, "but with the Keybatch system, the same amount of data can be processed in about three weeks. This resulted in a productivity increase of 60%. Now the operators aren't waiting for the machine to finish processing the data; the system waits for the operators."

The key-to-disk system is credited with reducing error rates to less than 1%, increasing the volume of data processed nearly two-fold and decreasing the time for keying financial documents.

"Our operators used to spend a great deal of time going back through source documents and researching the quantities to correct items on the error sheets. If errors occur now, a search locates the record within the batch that needs correcting, then the entire batch or only corrected records may be submitted," he added.

The output reformatting feature also has proved a time saver in the accounting area, one of the largest user groups. By using different output formats, data within a batch can be reorganized several ways to meet input requirements of individual programs.

Spectron Unveils Portable Testers For Field Use

MOORESTOWN, N.J. — Spectron Corp. today introduced two portable Datascope data communications test instruments for use in field troubleshooting.

The two models — D-301 and D-302 — feature large storage capacity and speeds up to 72 kbit/sec (D-301) and 2.5M bit/sec (D-302).

System operation is shown in full detail, making errors caused by software bugs, equipment malfunctions or line troubles immediately visible.

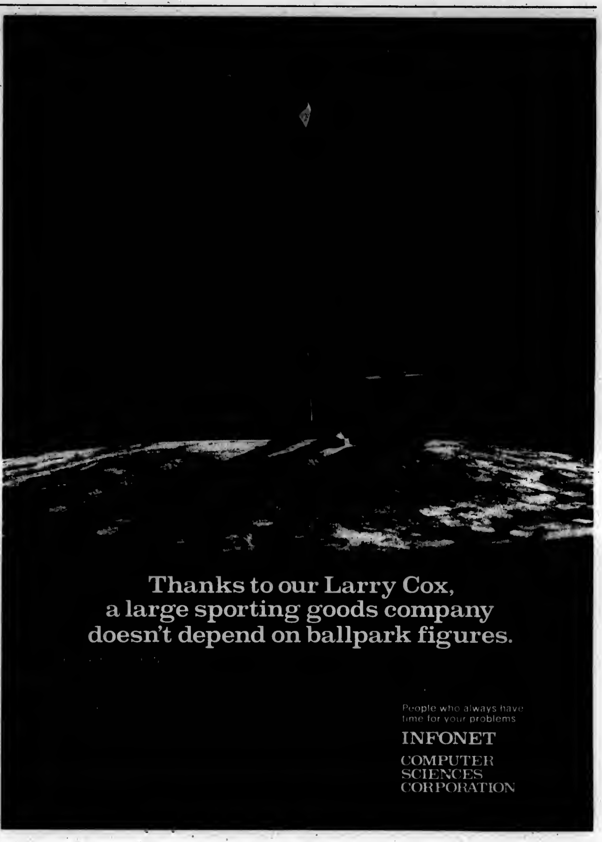
The D-301 incorporates an all electronic buffer that allows operation at speeds up to 72 kbit/sec. Features include independent speed, synchronizing and setup for each side of the line, right and left justification for codes of less than eight bits.

The D-302 contains all the features of the D-301, but operates at speeds up to 2.5M bits and has a programmable input trap to permit recognition and capture of complex occurrences at high speeds, according to Spectron.

The D-301 Datascope costs $6,800; the D-302 is $11,200.

Spectron Corp. is located at 344 New Albany Road, Moorestown, N.J. 08057.

Texas Instruments
Portable Data Terminals
FOR SALE
• 743 • 745
BEST PRICE • FAST DELIVERY
CALL TOLL FREE 800-323-2288
IN ILL. CALL 312-279-1960
Data Equipment Group
ICE, INC.
772 N Church Rd
Elmhurst, Ill 60126


Thanks to our Larry Cox,
a large sporting goods company
doesn't depend on ballpark figures.

People who always have
time for your problems

INFONET

COMPUTER
SCIENCES
CORPORATION

The secret to success is a little bit of selfishness. And Perkin-Elmer peripherals.

We're a little bit selfish.

Let's face it.

You want to be successful. We want you to buy Perkin-Elmer peripherals.

The more successful you are, the more Perkin-Elmer peripherals you buy.

That's why we set up our entire peripherals operation to help make you more successful.

It's really quite simple. And a little bit selfish. Here's the way it works.

We make you really price competitive.

At Perkin-Elmer, we know a "stripped down" peripheral doesn't always make you competitive. And a peripheral with more features than you need can be just as bad. So at our Terminals and Wangco Divisions, we build peripherals with only the features you want, and you pay only for the features you need.

Using our peripherals in your product means your product hits the market sooner and stays on the market longer. Because, together, we thought it out. And matched it to the application. From the very beginning.

Over 200,000 quality products.

When you buy Perkin-Elmer, you buy proven quality. Right now, Perkin-Elmer has over 200,000 terminals, printers, and disk, tape, and floppy drives out there. Working. In systems just like yours. That's quality.

Support when you need it.

And, when it comes to support, we're available. For consultation. Product planning. Training (your people or your customers). And especially for service. In fact, one call to our No-Hassle Toll-Free 800 number gets you service. When you need it. Where you need it. Day or night.

QC to stretch your service dollars.

Uncompromising QC. That's how we became a Fortune 500 company.

Perkin-Elmer QC people and their test procedures are the best in the industry, which means your product is more reliable and your service dollars go a whole lot further.

Now you be a little bit selfish.

In fact, why not get started right away? For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free (800) 631-2154.

Here is my business card. Tell me how to be a little selfish with ☐ terminals ☐ printers ☐ disk drives ☐ tape drives ☐ floppy disks.

PERKIN-ELMER
Data Systems

N-8370 Links N-8350, N-8450

NCR Tops Off Mid-Scale N-8300 Line

By Frank Vaughan
CW Staff

DAYTON, Ohio — NCR Corp. has introduced the N-8370, its most powerful member of the N-8300 medium-scale family to date. The most powerful system reportedly has twice the power of the N-8350, formerly the most powerful 8300 unit, and can accommodate up to nine programs at the same time.

The system provides a growth path between the N-8350, introduced last year [CW, May 2], and the N-8450, which has 25% more power than the N-8370, the firm said.

Under NCR's numbering scheme, the second digit of the model number in the 8000 series indicates the type of processor; the third digit describes the relative power within the processor class; and the last digit indicates special-purpose models. The prefix "N" indicates the model uses NCR Century software, while a "V" indicates virtual storage and an "I" denotes an interactive operating mode.

The 8370 system, which comes with a minimum of 96K bytes of main memory, features a CPU with a 750 nsec cycle time and four I/O trunks. Memory can be upgraded to 256K bytes in 64K-byte increments following an initial 32K-byte increment, compared with a 128K-byte limit on the N-8350.

The four I/O trunks consist of two with 120 kbit/sec transfer rates, one 545 kbit/sec line and one 900 kbit/sec line. The N-8370 comes with up to 10 integrated communications lines; a free-standing multiplexer can handle up to 253 lines.

NCR's N-8370 can handle up to nine programs at the same time and offers a step upward in processing power for users of the firm's smaller "N-mode" computers. The system has an extensive library of application programs.

The system can reportedly utilize all NCR Century applications, which the firm noted are available for a variety of industries including retailing, financial services, commercial, manufacturing, healthcare, education and government operations.

A 96K-byte N-8370 with multiprogramming, four I/O trunks, operator console, CRT, thermal printer and a dual magnetic tape cassette unit sells for $80,000; monthly rental under a five-year lease costs $1,856/mo.

Other available peripherals include card punch, card reader, line printers with speeds up to 2,000 line/min, disk units with capacities up to 96M byte/unit and magnetic tape units with densities of 200- and 1,600 bit/in. Languages available with the system include Cobol 68 and 74, Neat/3, Fortran and RPG as well as a variety of utility routines, a spokesman said.

The N-8370 will be available for delivery in the third quarter, he added.

Ex-Keypunchers Boost Productivity 18%

Special to CW

BUFFALO, N.Y. — The Daughters of Charity Hospital here said it increased DP productivity by 18% and reduced mainframe processing time by more than 10% after replacing keypunch equipment with a key-to-disk system.

The hospital recently added a wing, expanding its capacity by 20% for a total of 533 beds. The hospital's DP department processes more than 4,000 patient charges daily. All data for payroll, accounts receivable and admissions are handled by the department.

"The keypunches were like a vicious circle," DP Director Don Bennett said. "More patients meant more data, which meant more keypunches with more operators, more cards and more problems with the cards."

The hospital was encountering backlogs and efficiency problems using the keypunches, according to Bennett, who noted maintenance problems with the equipment also contributed to the backlogs.

"We had all the usual problems with the keypunches," he continued. "The cards got lost or out of sequence, and we were always rerunning batches because it is impossible to verify any errors until the mainframe rejects a batch."

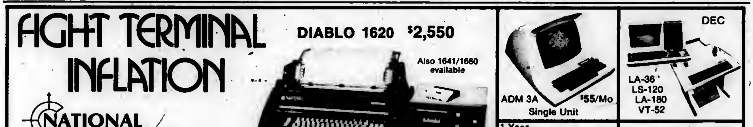
The Daughters of Charity Hospital has saved over $3,500 in card costs since it began using a key-entry system.

One year ago, the hospital replaced its five IBM Model 129 keypunches with a Mohawk Data Sciences Corp. (MDS) 1200 data entry system. Now, slightly more than a year after installation, Benettt indicated the DP-department can handle the additional DP requirements brought by the hospitals' expansion without hiring additional operators.

Materials costs have been reduced, and the number of operating hours on the hospital mainframe have been cut by more than 30 hours each month, Bernett said.

"We're going though more than

(Continued on Page 34)



FIGHT TERMINAL INFLATION

NATIONAL COMPUTER Communications Corp.
The Greatest Name in Terminals

Call 800-243-9006 TOLL FREE

BOSTON 617-235-7055 NEW YORK 212-354-6666
CONN 203-325-3831 NEW JERSEY 201-768-4662
CHICAGO 312-296-0830

DIABLO 1620 $2,550
Also 1641/1660 available

- Low Rates
- Fast Delivery
- 1 to 3 Year Rent/Lease Plans
- No Automatic Renewals on Any Rental or Lease
- Choice of Rent/Lease/Purchase
- Mix and Match Master Agreements

Techtran 8400
$1,795

ADM 3A $55/Mo
Single Unit

DEC
LA-36
LS-120
LA-180
VT-52

1 Year Rental
NCC-1043 (TTY-43)
132 Print Positions
As low as $38/Month

Also 765/743 733
T.I. 745 - $92/Month
1 Year Rental

Key-to-Disk Boosts Hospital's Productivity 18%

Data Entry Dimensions

(Continued from Page 33)

250,000 cards each month," he recalled. "We've saved $3,500 in card costs alone, since we installed the key-to-disk equipment a year ago."

An eight-month feasibility study was conducted by Bennett and the hospital's keypunch supervisor to search for a reliable, simple-to-program data entry system.

During the study several vendors were visited and asked to compose data entry formats for the hospital's patient charges. MDS was the only vendor which could compose the formats without consulting programmers and systems people, he indicated.

"We required a system that was cost-efficient, reliable and simple to operate," Bennett said. "We could have used the IBM 3741, but that would have involved additional steps to convert it to tape. It also meant handling floppy disks all day, and the cost was out of our range. With the other vendors we investigated, there were the same programming and cost problems.

"The MDS people were able to establish the data entry formats in a single afternoon while we were there," he added.

Bennett said that use of the key-to-disk system has allowed the DP department to handle a dramatically increased workload without adding personnel or increasing mainframe activity.

"Our workload increased by almost 20% when the hospital expanded," he said. "we replaced the five keypunches one-for-one with the terminals and, despite the increased workload, our backlogs have disappeared and we are planning on formatting additional applications.

"In addition," he said, "we find ourselves running the same jobs on the mainframe in 30 hours less per month than with the keypunches because we seldom have to run correction batches."

The hospital required 83 data entry formats for its applications. The formats, which convert the papersource documents the hospital uses into CRT images, were composed by the hospital's data entry supervisor, Hanna Patrick, in several weeks.

"I never worked with computers before and at first I had no idea what to do," Patrick said. "But after I worked with the instructor periodically for a couple of weeks, they were no problem at all to write.

"All I had to do was specify the size of the record fields we required and it was done," she said. "We added a lot of prompting questions to make things easier for the operators."

Patrick anticipated morale problems among the operators because of the new equipment, but she said the opposite occurred.

"From the first day we unplugged the keypunches and used the terminals, the staff saw the improvements," she said. "The operators went through a short training program to learn the use of the terminals and we were set to go.

"And we certainly appreciate the fact that the key-to-disk equipment makes no noise. We couldn't hear a thing with those keypunch machines going," she added.

When the equipment was installed, the conversion time was "transparent," according to Patrick. "The system was up and running before we knew what was happening. We kept the keypunches around for a few weeks just in case, but that was unnecessary."

The DP operations at the hospital are streamlined with the key-to-disk equipment because each operator has access to every data entry format on each of the five terminals.

"Each time an operator changed the job she was working on with the keypunches, she had to go over to the files, find the program card, then start punching," Patrick said. "Worker productivity is up now because with the push of a button the format is there, and the operators are ready to go."

Since the mainframe computer is used 10% less each month, Bennett said the department is going to experiment with new applications.

"Presently our Blue Cross billing is handled under a separate division," he said. "Since we are now completely familiar with the system we feel confident enough that we can add additional capabilities to further streamline our operations.

"There is also no reason why we can't process the dietary and menu programs, which are all done by hand now," he added.

Bennett said there have been no system crashes, but should that event occur, MDS helped arrange a reciprocal agreement with another System 1200 user in Buffalo to provide the hospital with backup processing facilities in an emergency situation.

"I've been in the DP business for 23 years," Bennett said, "and throwing out the keypunches and installing this equipment is the greatest relief I've had in all those years."

'The Computer Heard About Man's Best Friend, So . . . '

RFP for Minicomputer based Police Record and Information System will be issued shortly. For information and receipt of RFP please send qualifications to:

E.M. Raczkowski
Arthur Young & Co.
7 Penn Center Plaza
Phila., Pa. 19103

BLIS/COBOL
MULTIUSER OPERATING SYSTEM

NOVA/ECLIPSE
BLISsful

For information call today

IPI SOFTWARE
Phone (305) 647-2200 USA
TWX/Telex 810-853-5033
1850 Lee Rd., Winter Park
(Orlando), Florida 32789

3340/3344
DISK DRIVES
Wanted to purchase or trade.

COMDISCO
312-698-3000

IEBCOMPR
IS DEAD

If you've always wanted IEBCOMPR to
- Underline Unequal Bytes
- Print Hex and/or Character
- Compare Specific Records or Fields
- Predefine Error Record Quantities
- Compensate for Missing Records
- Print Portions of a Record
- Process VSAM Files
- Compare an entire PDS

Then call us for a free 30 day trial of ACCUCHEK.

ARKAY COMPUTER INC.
24 Manor House Road
Newton Centre, MA 02159
(617) 964-1894

Want to know more about fast, accurate data entry? Ask these fine companies:

Goodyear
O. M. Scott
Dow Jones
GTE Data Services
Pitney Bowes
Reynolds & Reynolds
The Travelers
Toledo Edison

They all chose Scan-Optics OCR Systems!

In scores of data processing operations around the world, experts have carefully evaluated OCR systems for data entry, studied performance/price ratios . . . and ultimately selected Scan-Optics Systems for accurate, high-speed page and document processing.

All S-O Systems operate off-line. We offer you OCR systems and ScanEdit™ Systems which provide optical character recognition and video processing/display capabilities integrated with key data entry functions.

Now's the time to make *your* evaluation.

Call or write:

Name
Title Phone
Company
Address
City State Zip

SCAN-OPTICS, INC.
22 Prestige Park
East Hartford, Ct. 06108
203/289-6001

Save $200,000/Year

Processors Give Auto Club Same-Day Banking

DEARBORN, Mich. — Same-day banking is a dream for many collection managers, and Joe Chattinger of the Automobile Club of Michigan is no different. The club collects over $1 million cash a day, mostly insurance payments. A day saved in deposit of those funds could mean over $5,000 a month in "float" value alone.

That dream has become a reality for Chattinger. By using a payment transaction processor, the 1,250,000-member club deposits 85% to 100% of its cash the same day it is received, at least three days a week.

Besides an estimated $63,000 a year in investment credit or float value, the Michigan Automobile Association of America (AAA) affiliate said $155,000/year is attributed to direct productivity cost savings — plus additional benefits of improved customer service, tighter control and job enrichment for employees.

Through a combination of optical character recognition (OCR) read and operator-keyed data, the IBM 3762 payment processor permits one-step processing of premium notices — or any turnaround invoice — and related checks, eliminating the batch balancing of traditional payment processing.

In one pass at one workstation, the 3762 validates a transaction, inscribes/encodes/endorses bills and checks as needed, prepares bank deposit documents and creates a computer record for updating receivable files. This one-step process eliminated manual reconciliations, duplicate handling of data, microfilming and most presorting.

At the club's headquarters, four dual-unit IBM 3762s at eight workstations process 15,000 to 20,000 transactions a day. mixing membership renewals and premium payments for the club's automobile, life, homeowner's and boatowner's insurance. The 3762s are linked to an IBM, 370/158 CPU in the form of distributed processing.

User Control

Functionally, however, the operation is almost entirely independent of the main CPU. For all the system's obvious values, the most prized may well be the least visible — user control.

Installed in a little over three months, the 3762 operation attached smoothly to the club's extensive on-line operation and 55-branch statewide telecommunications network.

"The 3762 brought the company the final step from three- and four-day banking to at least 85% same-day banking," Chattinger said. "Moreover, we ended up saving over $200,000 a year, a bigger overall cost savings than anyone anticipated. Even with same-day banking and breaking even in cost, we would have been happy with the results. The additional value is a tribute to the system and the enthusiasm and control of the user."

"Our basic philosophy is to make the user responsible for systems, with control in the user department wherever possible. Systems people would have handled this entire project four or five years ago. The user would have let other people solve the problems. The 3762 can be entirely user controlled. You can format and program it yourselves. You don't have to get a priority list with computer operations to use it," group processing manager Bob Whaley added.

From 12 Steps to One

The one-step approach replaced an old cash-processing method at the Michigan club. Remittance processing, lifeblood of the insurance business, was one of the last areas for system changes.

The club itself is sophisticated in the use of DP, with IBM large-scale CPUs here and over 200 IBM 3270 CRT terminals throughout the state. On-line applications range from claims reporting to policy rating, from verifying applicant driver records to processing automobile en-

(Continued on Page 40)

Real productivity is a function of time and performance controls. The Panasonic Data Entry Terminal helps by providing simplified, immediate, error-free transmission of data by any worker, at any station, directly to the computer.

Here's how. Employees carrying identification badges insert them into a Data Entry Terminal when arriving or departing from work; changing work stations; or performing tasks with different pay scales or specific recordkeeping requirements. The employees' identities and other pertinent information are instantly transmitted to the computer.

That's it! No time card conversion to punched cards. No transposition errors. Immediate data availability.

And the Panasonic Data Entry Terminal makes source data acquisition a practicality almost anywhere. Designed for reliability, it combines a unique optical punched badge reader with advanced CMOS IC's to eliminate the need for any moving parts. The compact, lightweight enclosure is molded of high-impact material which stands up to tough industrial environments. Priced within reach, the basic unit is available with a variety of options, so you buy only the data collection capability you need.

What's more, the Terminals are designed to interface with most data processing equipment, both on-line and off-line. Frequently they will be compatible with equipment presently in use.

For added economy, any number of Panasonic Data Entry Terminals can be used on a single line without the need for an expensive multiplexer or other line controlling device.

For more information on the system that gives you tight time and cost control to improve productivity, write or call Panasonic Industrial Sales Division, 2960 Hart Drive, Franklin Park, Illinois 60131. (312) 451-1340.

Put a Panasonic Data Entry Terminal into your payroll recording system and watch your productivity improve.

Panasonic
just slightly ahead of our time

Plug-Compatible CPU to Link IBM Tellers

By Tim Scannell
CW Staff

BRIDGEPORT, Conn. — The Citytrust Bank here recently installed a large-scale, IBM plug-compatible CPU that will be the driving force behind an on-line system ultimately linking terminals in 31 branch offices throughout the southwestern Connecticut area.

"We now have five branches installed off-line and are just completing the tail end of our on-line system design and getting ready to start coding," according to Michael George, senior vice-president and head of Citytrust's Operations Division.

On-Line Communications

The bank's Automated Teller Program, (ATP) scheduled to become operational later this year, will provide on-line communications between the IBM teller systems already present in each branch office and an Itel Corp. AS/5 Model 1 set up at the Bridgeport headquarters, George stated.

The biggest advantage of having a "totally on-line automated" system is that it will reduce customer waiting time at the teller's window. "Nobody wants to stand in line anymore," George said.

"From a technical standpoint, the teller's job is going to be much easier, which will allow the teller to really interface with the customer," he added.

Demands on Tellers

A teller's job is very complex today, George pointed out: "We ask tellers to be a lot of things. We ask them to be technicians, then we ask them to be marketing people and then we remind them to be a lot of other things in between."

All in all, "it's a very difficult job," he stated. The ATP system will allow the bank to "eliminate much of the technical training that goes into being a teller and spend that time teaching them to be good customer service people and to offer more personalized banking."

On-Line Experience

On-line banking is not new to Citytrust's operations, George observed. Although most of the branch banking transactions with the main office were conducted in a batch mode, the bank did have some on-line capabilities.

Citytrust was operating an on-line inquiry system of 25 automated teller machines (ATM) that were connected on-line and a computerized personal trust system. So "going on-line isn't totally foreign to us," George said.

He noted, however, that the ATP system will involve integrating 370 terminals scattered a great distance from each other.

Better Price/Performance

The Itel AS/5 at the main office contains 1M byte of memory, several IBM 3420 tape drives, Itel disk drives and two printers.

Although Citytrust officials had considered IBM 370/148 and 158 configurations, they decided to purchase the AS/5 because "it offered a price/-performance that we didn't feel any of the IBM machines could touch," George stated. "We spent about three months evaluating what our alternatives were before we made the decision to go with the Itel equipment.

"Frankly, after seeing the design of the AS/5 vs. what IBM was marketing, we felt the Itel was technically a more advanced machine," he remarked.

Even though the ATP system is not operational, "all the other major applications in the bank are running on the AS/5 right now . . . with absolutely no problems," George said. "That includes checking accounts, savings, commercial loan, installment loans, Master Charge transactions and personal and corporate trust systems."

"Sure, I'd like to get five VERBATIM™ TC-1200 data cartridges and only pay for four!"

89-4-3-78
Name:
Title:
Company:
Address:
Phone: ( )
City: State: Zip:
Type of equipment we use:
Offer void where prohibited, expires June 15, 1978.
Mail to Information Terminals Corp., 323 Soquel Way,
Sunnyvale, CA 94086.

Or Call Toll Free:
(1) 800-821-7700, ext. 515
(In Missouri call: 800-892-7655, ext. 515)

IBM 5100 and Tektronix 4051 users: Let's talk!

At ITC we're working on some interesting ideas for your removable magnetic storage media. We know you'll want to keep informed. To make it easier for you to let us know where you are, we're giving you a first-ever (and limited time) 20% discount on a box of five quality VERBATIM TC-1200 data cartridges.
Use the coupon or call our toll-free number and our local office will be in touch with you.

Call any of these ITC Regional Office numbers:
Eastern Region: Pittsburgh, PA (412) 563-6655, TWX: (510) 697-0784
Central Region: Overland Park, KS (913) 642-2185, TWX: (910) 749-4045
Western Region: Sunnyvale, CA (408) 245-4400, TWX: (910) 339-9381
Just let us know where you are!
Thanks.

Information Terminals Corp.

Lear Siegler CRT's
For Sale
ADM Series
1, 2 & 3
BEST PRICE
FAST DELIVERY
CALL TOLL FREE 800-323-2288
IN ILL. CALL 312-279-1960
Data Equipment Group
ICE, INC.
772 N. Church Rd.
Elmhurst, Ill. 60126

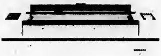
How to drum-up a first-rate demonstration.

Now you can come face to face with the best 36 inch roll fed drum plotter in the business – the new CalComp 1055.

Better still, you can do it in your own area.

It's easy. Just make plans to attend one of the following special demonstration sessions listed below.

For a head start on a good seat, simply fill out and mail this handy reservation card.



Cities	**4/25**	**4/26**	**Cities**	**5/3**	**5/4**
Boston	☐	☐	New York Area	☐	☐
Washington D.C.	☐	☐	Atlanta	☐	☐
Detroit	☐	☐	Houston	☐	☐
Los Angeles	☐	☐	Sunnyvale	☐	☐
Denver	☐	☐	Chicago	☐	☐

☐ late morning ☐ noon ☐ early afternoon ☐ late afternoon

Computerworld CW

Name

Company Title

Address

City State Zip

Phone

I also plan to bring the following associates

CALCOMP

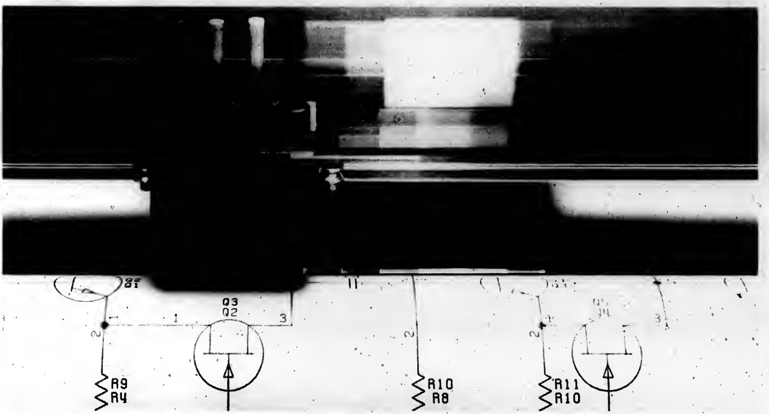
California Computer Products, Inc.
2411 W. La Palma Avenue, Anaheim, CA 92801

First Class
Permit
No. 653
Anaheim, CA

CALCOMP

California Computer Products, Inc.
2411 W. La Palma Ave.
Anaheim, California 92801

How to drum-up superior graphics in record time.



There's nothing to it.

Not when you start with the best. And that's exactly what the new CalComp 1055 high-performance drum plotter is – the best. In fact, it easily surpasses everything we – and our competitors – have created to date.

There's simply no other 36-inch, roll-fed drum plotter with specs like these. Plotting speed is an unprecedented 30 inches-per-second (762 mm-per-second) on axis. Complemented by a 4G acceleration ramp and 10MS pen-down time. The results are unbeatable quality and throughput.

What's more, you get the versatility that only four pens can provide and a practical, roll-fed design that keeps operator intervention to a minimum.

But that's not all. For increased accuracy, we made the 1055 completely d.c. servo-motor driven. And we gave it a special linear pen drive mechanism to help maintain consistently superior line quality. In every application.

The bottom line is this: Our new Model 1055 creates an entirely new set of standards for all would-be, high-performance drum plotters. In terms of speed, accuracy and line quality. And in terms of good old-fashioned price/performance, too.

Of course, you may not need the sophistication of a 1055 right now. In that case, our new 1051 is the answer. You get 10-ips performance today, and the ability to field upgrade to a 1055 tomorrow – when your needs have expanded.

One thing hasn't changed, though.

CalComp service and support. It's still worldwide and second to none. For field service personnel. For in-place field systems analysts. And for the kind of help you expect from the world leader in digital plotters.

All of which proves, when it comes to high-performance drum plotters, CalComp's really drawing away from the competition. Again.

To arrange a special preview demonstration of the new 1055, please call your local CalComp sales representative in the following areas:

CALCOMP
2411 W. La Palma Avenue, Anaheim, California 92801

WEST: Orange CA (714) 639-3690 / Santa Clara CA (408) 249-0936 / Houston TX (713) 776-3276 / Dallas TX (214) 661-2326 / Englewood, CO (303) 770-1950 / Beaverton OR (503) 646-1186
SOUTH: Norcross GA (404) 449-4610 / Huntsville AL (205) 533-6260 **MIDWEST:** Southfield, MI (313) 569-3123 / Rolling Meadows, IL (312) 392-1310 / Dayton, OH (513) 276-3915 / Cleveland, OH (216) 362-7280 / Shawnee Mission, KS (913) 362-0707 / Bloomington MN (612) 854-3448 **EAST:** Waltham, MA (617) 890-4850 / Union, NJ (201) 686-7100 / Bala Cynwyd, PA (215) 667-1740 / Rockville, MD (301) 770-5274 / Pittsburgh, PA (412) 922-3430

Processors Drive Down Costs for Auto Club

(Continued from Page 35)

dorsements. But the cast system was a complex, multistep application.

Cash handling required as many as 12 steps, from presorting of mail and batch controls to microfilms and audit trail research. The key was batch control. Checks and premium notices were separated at the start, but had to batch balanced before cash could be deposited.

Differences Hand-Printed

Premium and membership renewal bills or "stubs" were scanned, differences between check and bill amounts then hand-printed for further scanning.

All scanner rejects were reviewed and keypunched for subsequent data entry. Reject rates were 2% or more, high for nearly 20,000 turnaround documents a day.

The process took three to four days and consisted of scanning the first day, review and correction of rejects the second day and a final run plus microfilming the third day. Over 95% of all batches were out-of-balance for one reason or another — usually simple clerical or keying errors or deviations between billed and paid amounts.

"The out-of-balance situations created much of the work. With club memberships, for example, a high percentage of items in a batch might be regular $26 dues payments. Finding one payment out of balance could be horrendous," Whaley said.

A series of moves helped make the process more manageable. Machines were installed to inscribe magnetic ink character recognition (Micr) characters on the face of the check and endorse the back with an audit trail. Special envelope opening equipment was installed in the collection department, bypassing the mailroom operation. The changes were not enough. "In October 1976 we set a goal of same-day banking," Whaley noted.

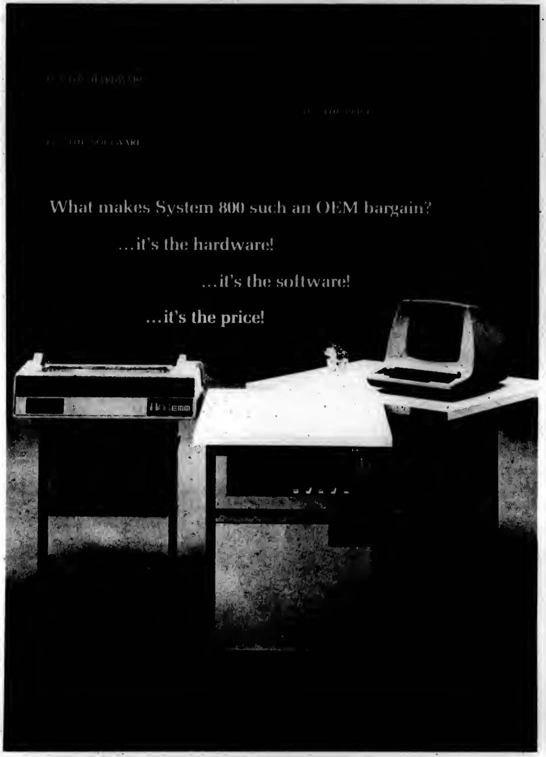
'Near-Impossible' Schedule Met

At about that time, the club learned of one-step processing equipment. An in-house task force under user control set and met a near-impossible installation schedule. Actual "programming" came to roughly 10 man-days, mainly creating an output record compatible with existing host computer operations.

Ten days after its August installation, the 3762 was fully operational. One month later, $1.4 million has been banked through the system in one day. Within three months, 70% to 100% of all cash was deposited the day it was received.

With same-day banking, the tangible value of the 3762 approach totals well over $200,000/year. Except for Mondays, which are usually double normal volume, the club is steadily improving its deposit percentages. Whaley said, "We can get a rough idea of our cash flow for the day at 10:00 a.m. by counting input trays. We never had that kind of control before."

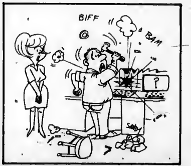
Through a unique cash management approach, the club has also achieved same-day banking for payments made at branch offices, 40% of total volume. All branch-payment checks are deposited in local banks. By 2:00 p.m. each day, all branches key the amount deposited on 3720s. The Dearborn office telecopies this data to the head office of a Detroit bank, receiving immediate credit for cash deposited throughout the state. Payment documents are sent to Dearborn for next-day entry into the computer.



Firms Offer Free Brochures

The following firms are offering free brochures:

- A catalog describing the American Microsystems, Inc. S2000 single-chip microcomputer is available from that firm at 3800 Homestead Road, Santa Clara, Calif. 95051.
- A 12-page illustrated brochure is being offered by Powertec, Inc. on the company's OEM II series of open-frame dc power supplies. Powertec is located at 9168 DeSoto Ave., Chatsworth, Calif. 91311.
- A six-page application brochure detailing the design of a data-acquisition system that can be constructed with four dual-in-line packages is offered by the Micro Networks Corp., 324 Clark St., Worcester, Mass. 01606.
- A six-page brochure describing the features of the Verbatim TC-2000 and the TC-1200 data cartridges is available from the Information Terminals Corp., 323 Soquel Way, Sunnyvale, Calif. 94086.
- A six-page pamphlet describing the characteristics and applications of the Model J16 Digital Photometer/Radiometer can be obtained from Tektronix, Inc., P.O. Box 500, Beaverton, Ore. 97077.



'Did You Remember to Always Type a Space Before the New Opcode?'

On Micro Technology, Uses

Potential First-Time Users Get Briefing

By Ann Dooley
CW Staff

PASADENA, Calif. — Many first-time users don't know what to look for or what they're buying when they decide to purchase a small business system, Bob Harp, technical director for Vector Graphics, Inc., told a Micro-Business '78 audience here last week.

Harp outlined some of the technical advances in microcomputers and some of the components of typical microcomputer systems for his audience so they would have a better understanding before buying a system.

Recent advances have enabled large amounts of data to be put on a single chip, which in turn has created low-cost memory, Harp noted.

The impact of these advances means a greatly decreased cost for the overall system, an increase in reliability, the availability of smart peripherals — or peripherals that used to be primitive but now have a chip built in — and low-cost software, he said.

Software costs will decline with increases in volume, according to Harp.

Typical Applications

A user can expect to use his microcomputer system for several applications such as word processing, inventory control, accounts payable, accounts receivable, general ledger, taxes, real estate investment analysis or projections on cash flow and mailing lists, Harp said.

Harp outlined a typical system for his audience that included a mass storage device, usually a disk that is used for program and data; a micro which includes the mainframe and boards; a data entry terminal, usually video, and a hard-copy or dot-matrix printer.

Disks are preferable because they can be accessed quickly, whereas tape has to be run through before locating the necessary information, Harp noted.

He went on to tell his audience that the components of a micro are a serial and/or parallel I/O device, permanent read-only memory (ROM) programming, a CPU, main memory or random-access memory (RAM) and a disk controller. Optional equipment can include an alphanumeric video display, a tape cassette interface and an analog interface, he added.

For a business application, a user would need more RAM and a minimum of 8K memory, although a more typical size would be 32K, he said.

Harp recommended the user select a common, time-tested CPU such as the Altair 8080 or the Zilog Z80.

The business user picking a mainframe should select one with at least 15 slots, should find out if disk drives can be built into the mainframe and should avoid front panel switches because they tend to scare a nontechnical user, according to Harp.

CW at Micro-Business

Disk capacity ranges from 45 pages of text/disk to 180 pages or from 1,000 items to 4,000 items of inventory, Harp explained, adding that the price doesn't increase in direct proportion to the added density.

The software should be Basic, which has a half dozen versions, and the user should know enough programming to be able to make modifications, Harp told the audience.

Price for a typical system with a terminal, printer, mainframe, CPU, 32K of memory, a serial I/O and disks would amount to approximately $6,600, Harp estimated.

CW Photo by A. Dooley

Bob Harp

Interdata Packages Minis Into Ready-to-Use Systems

OCEANPORT, N.J. — Interdata has packaged several of its minicomputers into systems that are ready to use, according to the firm.

The Pack 160 and Pack 320 offer users the "essential components for program development work," according to Ron Johnson, systems product line manager for the firm.

But at the same time, he said that both systems are "minimally configured building blocks" that can be expanded by users for particular application needs.

The Pack 160 includes a 16-bit Interdata 8/16E processor with 64K of memory, a 10M-byte disk and a Model 1100 display terminal. For a base price of $26,280, the system includes Extended Fortran IV, an OS/16MT2 operating system, a multimedia diagnostic package, universal clock, powerfail/auto restart, auto-load program and hex display panel, the firm said.

Interdata Pack System

Memory on the unit is expandable to 256K, the company added.

The Pack 320 system includes a 32-bit Interdata 7/32. Configured with 192K of main memory, a 10M-byte disk, a Model 1100 terminal, Dynamic OS/32 MT and Fortran IV software as well as the diagnostics package, universal clock, hex display, powerfail/auto restart and auto-load program, the unit costs $39,300, Interdata said.

Memory can be expanded to 1M byte.

Also available on the Pack 320 at the time of purchase are a communications subsystem and a multiterminal development subsystem. The communications subsystem includes the Interdata Telecommunications Access Method (Itam), high-speed data handling hardware and a Bell 201-type data set adapter. The communications subsystem, priced at $4,600, permits communications with another similarly equipped Pack 320 or host system using bisynch.

The multiterminal development subsystem, with an extra 64K of memory and four additional terminals, allows concurrent online program development, it added.

The subsystem costs $14,000 from the Interdata Division of Perkin-Elmer at 2 Crescent Place, Oceanport, N.J. 07757.

CALL TODAY * USE IT TOMORROW!!
*Because We will ship your order in 1 DAY From Our Stock of Over 6000 Computers and Peripherals

CENTRONICS REDUCED TO:
101A ... 165 CPS, 132 P P. $1250
102A ... 330 CPS, 132 P P. $1495
INTERFACES: RS232, PDP8 & 11, NOVA & PARALLEL

"NEW" DECWRITERS
LA36/LS120
ALL OPTIONS IN STOCK

AMERICAN USED COMPUTER
P.O. BOX 68, KENMORE STA.
BOSTON, MASS. 02215
617-261-1100

Mom gives so much and

Never again will you have to pay top dollar for data processing components. Not if Mom has anything to say about it.

Because she operates Mom's Warehouse.

And she sells big name components at small prices. Microcomputers, video and printer terminals, accessories, even complete systems. And soon on these pages, she'll be offering accessories, supplies, unique interfaces, and even kits.

So shop around.

Compare prices.

And discover for yourself that Mom's prices are tough to beat.

Mom buys in volume, gets volume discounts, and passes the savings on to you. Then she cuts her prices even further by eliminating salesmen and unnecessary hand-holding.

These clever ads are almost her only overhead.

Mom operates on a cash and carry basis. Send cashier's check or money order and she'll ship your order immediately. Send a check and she'll ship as soon as it clears.

Mom believes the computer industry is finally ready for her new sales concept. And she thinks buyers like you are sophisticated enough to make it work.

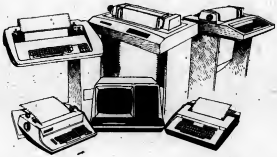
Whether you're a user or system builder, Mom's waiting to hear from you.

But prices are subject to change.

So write Mom soon.

asks so little in return.

Dear Mom:
You certainly are a cheap mother. Please send me the following products at the ridiculously low prices quoted below:



Qty.	Product		F.O.B. Price Each	Total
______	**DECstation 78 Microcomputer System** Includes Dual Floppy Disk System, Mom/2, OS-78, Fortran IV, Basic, Data Entry Package and Stand **Options:** Printer (Order LA36, LA180 or Diablo 1620 below)	Save $1000	**Just $7495**	______
______	RX78 second dual floppy disk system with 256K, 12-bit word capacity		$3950	______
______	**DECwriter II LA 36 Printer Terminal** With current loop interface	Save $ 380	**Just $1490**	______
______	**Options:** EIA RS-232C Serial Interface		60	______
______	14-key numeric keypad		95	______
______	Option mounting kit (required for the following options)		100	______
______	Top of form		150	______
______	Top of form, vertical tab, horizontal tab		285	______
______	Buffered send/receive (BSR), 8000 character solid state storage with search and edit		895	______
______	**Teletype 43 30 cps Teleprinter**	Save $ 182	**Just $1195**	______
______	**Data General Dasher Printer Terminal**	Save $ 710	**Just $1690**	______
______	**Options:** 11-key numeric keypad		100	______
______	Top of form		175	______
______	Combination top of form and numeric keypad		240	______
______	Speed-up Kit (increases speed from 30 to 60 cps)		250	______
______	**DECprinter I LA 180** With EIA RS-232C Serial Interface	Save $ 705	**Just $2695**	______
______	**Diablo HyTerm Model 1620**	Save $ 385	**Just $2965**	______
______	**Options:** Forms tractor		215	______
______	Pin feed platen		165	______

Qty.	Product		F.O.B. Price Each	Total
______	**Lear Siegler ADM-3A Video Terminal** (The Dumb Terminal)	Save $ 44	**Just $ 851**	______
______	**Options:** Lower case character set		100	______
______	Numeric keypad		100	______
______	RS-232 modem cable (10′) (If you're buying more than one Dumb Terminal, call Mom to discuss quantity prices.)		35	______
______	**Lear Siegler ADM-1A Video Terminal** With Numeric Keypad	Save $ 79	**Just $1511**	______
______	**Options:** Lower case character set		70	______
______	Edit		100	______
______	Printer Interface		130	______
______	End of line buzzer		20	______
______	RS-232 modem cable (10′)		35	______
______	**Lear Siegler ADM-2 Video Terminal**	Save $ 104	**Just $1991**	______
______	**Options:** Printer Interface		130	______
______	RS-232 modem cable (10′)		35	______
______	**ADDS Regent 100 Video Terminal**	Save $ 66	**Just $1259**	______
______	**Options:** Auxiliary I/O function keys		125	______
______	Detachable keyboard		95	______
______	**ADDS Regent 200 Video Terminal**	Save $ 89	**Just $1706**	______
______	**Options:** Editing		145	______
______	Detachable keyboard		95	______
______	**DECscope VT-52 Video Terminal**	Save $ 410	**Just $1490**	______
______	**Options:** Printer Interface		215	______
______	**Data General 6052 Video Terminal**	Save $ 500	**Just $1490**	______
______	**Options:** Printer Interface		400	______
______	**Data General 6053 Video Terminal**	Save $ 600	**Just $1690**	______
______	**Options:** Printer Interface		400	______

Qty.	Product		F.O.B. Price Each	Total
______	**Bar Code Starter Kit** For Alpha-numeric bar code. Includes Intermec 9210 code 39 reader with dual RS-232C connectors, hand-held bar code reading wand, bar code labels and application notes on warehousing, production control and libraries.	Save $ 100	**Just $ 895**	______
______	**TC 3002 Acoustic Coupler** Switch selectable originate or answer, 300 baud.	Save $ 66	**Just $ 199**	______
______	**Techtran 815 Datacassette**	Save $ 150	**Just $ 795**	______
			SUB-TOTAL	______
			California residents add 6% sales tax plus any local taxes.	______
			GRAND TOTAL	______

I understand that these are just some of the products Mom carries. If I want a product that's not listed here, I'll call you, Mom, for your low price.

☐ Mom, I don't want to order now. But please see that I hear from you every time you come up with a new money-saving opportunity.

Ship to:
Name______________________________
Company______________________________
Street______________________________
City______________ State________ Zip________
P.O. Number (if applicable)______________________________

For product and ordering information, call toll-free (800) 854-2039, 8:30 a.m. to 5:30 p.m. PST. In California, call (714) 560-5300 collect.

Shipping information: All shipping charges are COD. Your order will be shipped by normal surface carrier unless otherwise indicated. Everything is shipped in factory cartons with manufacturer's warranty.

Make checks payable to Mom's Warehouse. Prices subject to change without notice.

MOM'S WAREHOUSE

WE MOTHER YOU BY MAIL

P.O. Box 178300, San Diego, California 92117

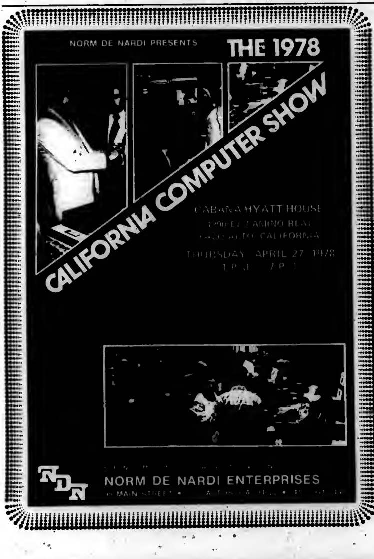
Are REDUCED COSTS and HIGHER THROUGHPUT two goals of your communications program? If so, don't pass up this opportunity. Investigate our offer.

USED COMPUTER
COMMUMNICATIONS
EQUIPMENT
4 CC-80
PROCESSORS
270X or 370X
EMULATION

Front-end Processing
Message Switching
Communications Control Applications
Modular Configuration for Easy Expansion
Memory Cycle Time of 540 Nanoseconds
Capable of Interfacing with 7 Host Computers

Recognized by some of the largest corporations in the nation for its outstanding quality and performance, the CC-80 Communications Processor is' truly state-of-the-art in communications hardware and software. The Midwest Stock Exchange has long been convinced of this and has been using CCI equipment since 1972 as the front-end for a sophisticated wire and order processing system. As a result of a phase-out of that service, all equipment is now being made available for sale or lease. Call or write us for additional details.

The Midwest Stock Exchange
120 S. La Salle Street
Chicago, IL 60603
Fred Siegman (312) 368-2462



Move to Disk-Based System Proves Boon to Lumber Firm

CLAIRTON, Pa. — The move from a card-oriented system to a disk-based system has provided Busy Beaver Building Centers, Inc. with greater throughput and smoother operations, according to the firm's DP manager.

Busy Beaver operates 27 retail lumber stores that are due to be connected to the firm's headquarters here through point-of-sale (POS) terminals within the next year, Kevin Tag, the firm's DP manager, stated. The stores are located in Pennsylvania, Ohio and New York.

Previously, an IBM 3/10-user, the firm began its experience with DP by putting an accounts payable system on its small IBM system in the spring of 1974. This was followed by a daily cash-auditing system, an accounts receivable system and a point-of-sale system that allowed the firm to gather sales information from its stores and to process sales analysis reports on a weekly and monthly basis.

Now, register tapes are forwarded to the firm's DP center for processing, but eventually Busy Beaver intends to convert to an on-line system, Tag said.

In 1976 the company decided it needed more processing power and began looking for a system that would support its future communications needs, Tag noted. "We wanted the type of capability that would allow us to place CRTs around the office so people could inquire about credit information or inventory status," he noted. "And beyond that, we needed quite a bit more disk storage.

Because an upgrade within the IBM line was probably the most logical step for the firm, it did look at the IBM 3/15 as well as at Univac's 90/30 system. The decision to rent the Univac system was based on a price comparison of the two. "Also, the 90/30 had more computing power,;" Tag added.

Since the installation of the more powerful system, the company has added various capabilities. The system now can transfer inventory between stores and process insurance reconcilations. But Tag acknowledged, "Basically, we've been in a holding pattern since the converison because we are planning on really developing our POS system."

With the updated system, the 90/30 will poll all of the store locations nightly to retrieve inventory and sales information that will be put into the credit and inventory files, he explained. The office users of the systems will have access to up-to-date information for decision-making, he pointed out.

The development work is being handled by the firm's 10-member staff and a consulting group, he noted.

The firm has noted many advantages with its system, especially increased throughput, Tag said. Also, "when we converted to the 90/30 we did away with our card punch. Now the system is totally disk-oriented," he said.

The system is also modular, he added, allowing the company to add core, tape and disk drives at will.

Converting from the IBM 3/10 to the 90/30 was "painless," Tag said, noting that about 98% of his systems are written in RPG-II The RPG langauges used on the IBM and Univac systems are similar, he added.

Stamp Dealer Grows 58% With Small System's Help

CHEYENNE, Wyo. — The use of a small-scale system has enabled a first-day commemorative stamp dealer, after nine years, to manage 31 times the business of its first year, with only six times the workforce.

Under the trade name Fleetwood, Unicover Corp., with a staff of 110 people, designs and markets first-day covers to more than 200,000 stamp collectors.

Headed by Jim Helzer, the mail order business was formed in 1968 and has grown at the compounded rate of 58% a year.

Helzer noted that the central customer information file on an IBM 3/15D has speeded up order processing and updating of the customer list.

Unicover, which generates 10 million to 12 million pieces of mail a year from its new 56,000 sq-ft facility also uses the computer for payroll, accounts receivable and general administrative purposes.

One of the system's most useful applications is helping company officials plan and implement marketing strategies through inventory control and analysis of forthcoming stamp isues, according to Helzer.

"We market all first-day covers offered in the U.S. Canada and the UK and selected issues from 130 other nations," Helzer said. "To assist us in developing marketing programs, we use the computer to maintain our central information file."

For example, the company will take France's first-day cover schedule, translate it and put the information into the System/3, he said.

"The system generates a report by category, month, subject and country," he added. "From that, we can look ahead 12 months to 18 months and pick what we want to market."

"From our friendly neighbor Canada to the People's Republic of China, we're at the forefront of first-day cover developments," Helzer said.

MDB Systems Offers Reader Controller

ORANGE, Calif. — Card reader controllers for several minicomputers are available from MDB Systems, Inc.

The units plug into Digital Equipment Corp.'s PDP-11 and LSI-11 systems, Data General Corp.'s systems and Interdata, Inc.'s minis and provide a parallel interface to most standard punched card readers, the company noted.

Said to be transparent to host diagnostics, drivers and operating systems, each controller is contained on a single circuit board.

The controllers are priced from $650, the firm said from 1995 N. Batavia St., Orange, Calif. 92665.

Three new Digital Disks.

RK07
28MB
$10,500
RM02
67MB
$18,000
RL01
5MB
$3,800
Typical subsystem including controller and two disk drives 10MB, $8,900

Your disk decisions just got a lot simpler. Three new Digital disks are here, and with them comes capacity, speed and state-of-the-art engineering at the lowest prices in Digital history.

The RL01 plus controller is the lowest priced disk subsystem available from any minicomputer manufacturer. Plus it offers such features as an embedded track following servo-mechanism, universal power supply and extraordinary simplicity — only five modules and eleven subassemblies.

The RK07 is a mid-range, high performance cartridge disk drive with features normally found on expensive drives over 100 megabytes.

And the RM02 will do for UNIBUS systems what the RM03 did for MASSBUS systems — give you 67MB capacity for a lot less money.

Each new disk offers superb hardware reliability features including wide design tolerances, advanced cooling systems and broad environmental specs. Plus you'll find valuable data integrity features such as the new servo system on the RL01, and error correction and offset positioning on the RK07 and RM02. And finally, there are remarkable maintainability features like modular assembly, easy-access design, extensive error reporting, and sophisticated diagnostic software.

A new brochure tells all about Digital's commitment to disk leadership — the new products, the new technology and Digital's brand new 430,000 sq. ft. disk plant in Colorado Springs, complete with its own design and engineering force. Send for your copy today. Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.
(Prices apply in U.S. only)

digital

Digital Equipment Corporation, 146 Main Street,
Maynard, MA 01754.
Attention: Communication Services (NR-2/2)

☐ Please send your brochure.
☐ Please have a sales representative call.

Name ______________________
Title ______________________
Company ______________________
Address ______________________
City ____________ State ____________ Zip ________

CW438

"Our Prime computers are the 'ba
departments in 200 banks. That
performance, and fantastic reliab

Al West, Chairman, and Steve Katz, President, SEI Corporation, Wayn

TRUST DEPA

ck room' for trust
takes flexibility,
bility."

Pennsylvania

Trust management is probably the most complex service a bank offers, and one of the toughest to computerize.

Since 1971, a growing list of banks have turned to SEI's on-line, interactive Trust-Aid system. At SEI's data processing center near Philadelphia, 25 Prime computers, communicating with over 500 remote terminals, maintain trust files, print reports, issue checks, and even automatically manage cash positions on a day-to-day basis.

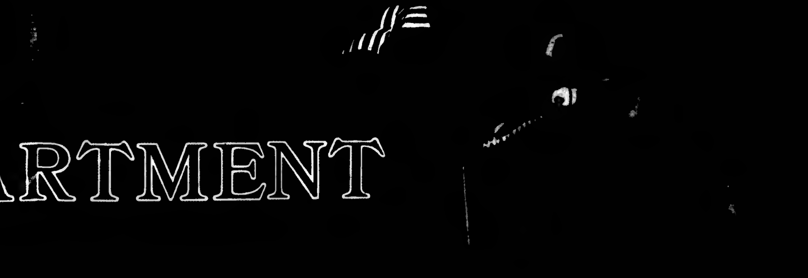
Multiple Prime computers, rather than a single large mainframe, allow SEI to offer fine-tuned software and services for each bank, lower over-all cost, and system uptime of over 99%.

Prime's family of interactive computer systems offers industry standard software including FORTRAN IV, BASIC, RPG II, COBOL, and a CODASYL-compliant Database Management System. They also have greater memory capacity than any other family of small computers: up to 8 million bytes of high-speed main memory, 2.4 billion bytes of disk storage, and 32 million bytes-per-user of virtual memory.

Prime computers are also true multi-user systems: one computer can handle up to 64 simultaneous users in such diverse activities as RJE communications, forms processing, on-line data entry, computational time-sharing, and database management. And the PRIMOS Operating System allows any user to use any language at any time.

For the detailed story of how Prime is helping SEI and for more on how we might help you, contact David R. Johnson, Marketing Manager, Prime Computer, 40 Walnut Street, Wellesley Hills, MA 02181.

PRIME Computer
"Prime is helping"



Cancer Laboratory's Mini Cuts Paperwork

Special to CW

LANCASTER, Pa. — Cytology Laboratory Ltd., manually processed over 36,000 smears and the associated paperwork last year. Each smear, when received, required a typewritten form, a manual search for a card with the written report, use of a copying machine to combine the report to the patient's doctor with his address, preparation of the patient's bill and address, posting receipts and an extensive filing effort. Follow-up billing had to be done manually.

If the patient's doctor wanted the patient to know examination results, a special search authorizing such disclosure was required.

Today, one clerk handles all these functions on a minicomputer, according to Roland A. Loeb, president of Cytology Laboratory, Ltd.

With software written by Prodata, Inc. of Carlisle, Pa., the system records each smear and stores the essential data as the clerk types it at a CRT station, The entries are checked and can be corrected on the CRT.

After the smear has been examined by a technician, the results are posted by typing a simple code. The mini searches for the doctor's permission to print out negative findings that are added to the patient's bill in layman's language. Results are printed in narrative form for the doctor.

The patient's bill is printed with authorized information and address. Second and third bills are printed if required, while periodic summaries are printed on request.

When a data file is full, the system calculates a statistical report and produces a hard copy of the file and a quality control report. On request, the mini will also print a sorted index.

Clerk's Job Simpler

The entire operation is greatly simplified for the administrative clerk. There is only one machine, no paper until bills and results are printed by the system and all records are filed and accessible, Loeb noted.

There is more data recorded than with the manual system. The laboratory technician is identified for each smear, results from previous smears on a particular patient are available and a permanent audit trail is available from the receipt of a smear to the final bill payment.

The system is based on a Data General Corp. Nova 3/D with a 32K word memory, dual floppy disks, a CRT and a Dasher printer/terminal. The half-bay cabinet, printing terminal and a desk with the CRT on it fit into one corner of the reception room so the clerk can act as a receptionist for incoming patients.

Loeb has identified several areas of savings that will allow the system to pay for itself in less than 3-1/2 years. On each smear there is a savings of 21 cents on paper and labor that totals over $7,560 per year.

The operation also increases the manpower available for other tasks within the laboratory.

Data can be retrieved much more quickly and the documentation of work performed is by itself insurance against malpractice allegations.

The Cytology system in this laboratory is just a start as Loeb visualizes it. The minicomputer has much more capability than is currently being used. The next step will be to add an accounting package to include payroll functions. Also being considered is the development of word prcessing capabilities for the system.

Not Turnkey

The cytology system was not sold to the laboratory as a turnkey operation. Rather, it was developed in the cytologist's office slowly, with extensive testing and continual modification so that it was exactly tailored to requirements. Loeb took a personal interest in the development and operation of the system.

Engineers Plan Forum Series For Mini Users

OAK BROOK, Ill. — The National Engineering Consortium, Inc. (NEC) will be conducting several programs of interest to minicomputer users this spring, a spokesman said.

"Introduction to micro/minicomputers" was designed for people with no previous computer experience and will cover such topics as the basic fundamentals of minicomputers, standards of system comparisons, an overview of software, and micro/minicomputer applications. The session will be held April 30-May 2.

Software Covered

Micro/minicomputer software development will be covered in another ~~sion~~ session held the same days. This discussion will cover software for on-line applications, communications and business applications; data structures and their usage; and memory management and scheduling, the spokesman said.

For engineers and managers who design products and systems using micros or minicomputers, the organization will present a session called "Successful Project Management of Micro/Minicomputer Systems" May 3-5.

Each session costs $495. Additional information is available from NEC, Oak Brook Executive Plaza No. 2, 1211 W. 22nd St., Oak Brook, Ill. 60521.

These companies have already signed to exhibit at Computer Expo 78:

NCR
Varian Graphics
Informatics
Honeywell
Datamation
Communication News
McCormack & Dodge
Data Rentals
Computer Sales International
Intel
Electronic Ventures
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing
S.E.A
Tri-Data
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems
Shasta
Mostek
DIVA
SBC Magazine
Tele-dynamics
Control Data
National Semiconductor
Printronix
Codex
Lear Siegler
E M & M
The Morley Company
Vanier Graphics
Total Typography
Wang Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Inforex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Informer
Computer Decisions
Infosystems
T-Bar
Corporate Systems
Dynatech
Western Union
Calcomp
General Computer
Atlantic Research
Telefile Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments
Computerworld
NCI
AT&T
Kodak
BASF
IBM
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service
Itel Corporation
Deltak
Peripheral Products
General DataComm Industries
Continental Peripherals
Computer Associates
Qantel
Diablo Systems
Marketechs
Racal-Milgo
Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
McGunn Safe
Allstate Computer
H/G Professional Forms
Nichols & Company
Datapro
Input Services
Plessey Services
Industrial Computer Controls
Vincent Data Products
World Info Systems
DP Power
Conrac
Educational Data Systems
Cybertek
Cosmic
Business Automation
Insyte Datacomm
YE Data
Arcus
St. Louis Info
Digilog
Herrera Kirby
Foto-fun
Hamilton Sorter
Dispotech
Consolidated Computer
Cybersearch
Wolfe Computer
Trac Associates
Sperry Univac
Xerox
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp.
Programs, Inc.
Beehive International
Intertec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tandem Computer
PCC/Pertec
Computrend
Extel
Mentel
Sycor
Digitronics
Computer Services
Datamart
Courier Terminals
Modems Plus
Software Design
Curtis 1000
Spectron
K&K Associates
Applied Digital Data
Epic Data
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rianda Electronics
Computer Corp of America
Cullinane
Hewlett Packard
Pansophic Systems

They've made a smart decision. Last year the nine computer market areas on our itinerary drew 42,178 qualified buyers.

This year we expect more than 50,000. Can you afford to miss this chance to present your products and services?

There's still room for you. But it's going fast. Get complete information with this coupon now, on how Computer Expo 78 can work for you. Or save time by calling Kim Wichert collect at 617-964-4550.

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

☐ **We're interested in exhibiting.**
  ☐ Have Sales Representative call me
  ☐ Send Reservation Agreement
  ☐ Send Copy of 1977 Attendee Analysis

☐ Southwestern Computer Expo	Houston	April 11-13
☐ Southeastern Computer Expo	Atlanta	April 18-20
☐ Gateway Computer Expo	St. Louis	April 25-27
☐ Midwestern Computer Expo	Chicago	May 2-4
☐ Mid-Atlantic Computer Expo	New York	May 9-11
☐ Great Lakes Computer Expo	Detroit	May 23-25
☐ New England Computer Expo	Boston	May 30-June 1

Name Title
Company
Address
City State Zip
Phone: ( )

CW at Micro-Business '78

Many Still Reluctant About DP

Small Business User Seen Misunderstood Breed

By Ann Dooley
CW Staff

PASADENA, Calif. — Many people are still uncomfortable with computer technology, and this applies to the small businessman who is thinking of getting a computer system but is unsure of what it will mean to him, according to Michael Levy, senior systems analyst and partner of Jethro, a consulting firm.

Speaking on a panel at Micro-Business '78 here, Levy told his audience that the small business user and his market are misunderstood. Statistics show there are 13 million small businesses in this country, but that figure is inflated. The Market is actually much smaller than many realize, he said.

In addition, it is not as easy for the small user to afford programmers and equipment as many people think, Levy claimed.

The reason the small businessman wants a micro system is to produce information used in the business on a timely basis and at a profit, he said. He wants the computer to save labor and increase productivity, Levy added.

Two types of systems are available; one is analytical and used in simulation, forecasting and cash flow, and the other is used for transaction and data manipulations such as payroll and order entry, he explained.

The micro people are trying to do what the mini makers and mainframers did — have the computer do the work of 15 people, Levy stated.

But, he added, a better application for the micro would be in busines analysis, providing information for better decision-making.

Slow Converion Advised

The small businessman should go into automating his business slowly, Levy said. He should see if he likes dealing with the system by dedicating it to one overriding job and adding other applications later. "It's important to do one thing well first," he advised.

Before deciding to computerize, a businessman should look at his company's size, revenue and number of transactions, according to Levy. Most micro users should be around the $1 million level in business volume and should be transacting 100 orders a day or 12 typed orders hourly, he said.

A micro system costs about the same as the salary of one clerical worker, and software usually costs more than the hardware, Levy noted. The costs can be justified if a business is well run and profitable.

A problem that frequently arises is the philosophical conflict between businessman and programmer. The small businessman often works intuitively and can't define his procedures in computer language, according to Levy.

The programmer, on the other hand, can often be compulsive about the system and operate the machine for his own purposes and not anyone else's, he said.

Another problem in automating a small business is that there are often no standard procedures; one person knows how to do the job his own way and resists changing, Levy noted.

It is essential to make the computer conform to procedures, not the other way around, he said.

Hal Whitestone, a management consultant for Arnold S. Daniels Associates, told the audience that since people are a vast source of untapped energy and a large part of the budget, it is important to use their energy efficiently.

Whitestone described the typical entrepreneur as a creative, confident, competitive, risk-taking, hard-working individual who expects others to do the same.

Most programmers, he said, are knowledgeable specialists with high standards who are more factually than people oriented, efficient and need direction. Employers often don't provide that direction, Whitestone claimed.

The consultant said he uses a "predictive index" to determine how easily the other person communicates and how changeable his behavior is.

A common problem occurs when programmers decide to become self-employed businessman and deplete their energy trying to cope with the changes. For best production, it is important to realize where people are most effective and encourage them to stay there, he added.

Hardware Problems

Michael Busch, vice-president of Info 2000 Corp. and the third panel member, spoke about hardware and hardware problems in the microcomputing industry.

A large problem is the rate of change. The industry is going through future shock and the rate of change is increasing drastically, he said.

Micro hardware is really no different from any other type; it's just smaller, cheeper and changing faster, Busch noted.

This trend often has a paralyzing effect on users, who think they should wait for three months and something better will come along. Unfortunately, they could wait forever, he added.

Users are afraid of becoming dead-ended or fearful they will have to keep buying each new product as it comes along, he said.

The solution to the problem is to get a piece of hardware that can incorporate new technology so it will give the user a growth path, according to Busch. He recommended the Altair 8080 family tree since it is fairly stable and its software has a longer life.

If not the 8080s, search out some equipment that seems stable and incorporate those into the specifications, Busch told the audience.

An additional hardware problem is maintenance, since manufacturers are not equipped to provide support for a system worth under $10,000, he noted. However, the equipment is usually reliable so the problem is not as severe as it could be, he added.

Another factor to consider is hardware vs. software economics, he said. Software has become much more expensive for the user than hardware and the budget must allow for this, Busch advised.

Levy closed the session by advising analyst consultants to clerify what the businessman wants from his system and to perform a study outlining those needs. The study should explain the purpose of the system so that both the analyst and businessman are satisfied the system will perform the tasks it was supposed to accomplish.

In addition, the study should include simple flowcharts to show component relationships, input specifications, file descriptions to delineate what will be stored and output report specifications, Levy stated.

Randal Upgrades Link-100 With Two-Sided Floppies

TORRANCE, Calif. — The Link-140 from Randal Data Systems, Inc. is a version of the firm's Link-100 system upgraded with double-sided floppy disk drives that reportedly increase the system's throughput by 50%.

Using Shugart double-sided floppy disks, the system can accommodate up to 4.8M bytes of auxiliary storage, with each drive handling 1.2M bytes. The system is both hardware- and software-compatible with other members of the Randal line, the firm said.

Two 132-column printers are available for the system, with speeds of 30- and 70 char./sec. Operating under the RTOS I time-sharing operating system, the unit can support two users operating concurrently performing business applications.

A basic system with 32K bytes of memory, keyboard/-printer and one drive costs $13,350 from 365 Maple St., Torrance, Calif. 90503.

TERMINALS FROM TRANSNET

TERMINALS
THE CHOICE IS YOURS

OUTRIGHT PURCHASE OR FULL OWNERSHIP AFTER 12-24 MONTHS UNDER OUR CONVENIENT 100% EQUITY RENTAL PLAN

	PURCHASE PRICE	*RENTAL PER MO. 12 MOS.	24 MOS.
DECwriter II	$1,495	$145	$ 75
DECwriter III	2,895	275	145
DECprinter I	2,495	240	125
VT52 DECscope	1,695	162	85
VT55 DECscope	2,695	260	135
ADM 3A CRT	875	84	45
ADDS Regent 100 ..	1,325	126	67
TI 745 Portable	1,875	175	93
Data Products 2230	7,900	725	395
Techtran 8400	1,850	170	93

*FULL OWNERSHIP AFTER 12 OR 24 MONTHS.

RENTAL AND LEASE PLANS AVAILABLE ON ABOVE AND OTHER EQUIPMENT

TRANSNET CORPORATION
2005 ROUTE 22, UNION, N.J. 07083
201-688-7800

you can be well connected for only $1285 or $38 per month.

The all new 43 Teleprinter, with Acoustic Coupler, is ready for immediate delivery. This quiet desktop impact printing terminal feetures full ASCII cherecter set, buffered 10 or 30 cps operetion. It prints up to 132 characters per line on regular paper. Modular, solid-state construction and self-test ability meens easy maintenence And, tha 43 Teleprinter, is supported with netionwide service

Time-Sharing
Data Entry
Communications

43 Teleprinter with Acoustic Coupler

READY FOR IMMEDIATE DELIVERY

At Manegement Response, we ere your Terminal Connection. We also have DEC LA-36, LS-120, LA-180, VT-52, Regent 100, end more. READY FOR IMMEDIATE DELIVERY.

Order now, right from our stock, CALL TOLL FREE: (800) 323-2135

management response corporation

Real-Time System Keeps Atlanta Maps Current

Special to CW

ATLANTA — What first started out as a program to provide the police department here with up-to-date maps showing criminal activity has since turned into a real-time interactive graphics program that allows any computerized file in the city to be referenced to any specific address, by geographic coordinate, according to officials.

Called the Georgia Coordinate Mapping Project (GCMP), the mini-based system creates address and intersection coordinates, or centroids, for any legal address in the city, providing a tool to link the data bases maintained by various city agencies to common reference points.

A total of 813 different 20-in. by 30-in. planimetric maps covering the 175-square mile Atlanta metropolitan area have evolved as a result of this program.

"In the past, different city agencies were using different reference points and scales to map their activities," according to Vic Davis, graphic group leader at the Systems and Programming Division of the city's Bureau of Management Systems. "As a result, information could not be transferred easily from one map to another."

Davis noted that maps in the city were based on a variety of standards — some on federal topographic surveys, some census tracts and others on coordinates established by the locations of pumping stations, to name a few. "Thus, if an administrative change were made in one department — changing the boundaries of police beats, let's say — fire department maps might not be easily upgraded to reflect this."

Brought Commonality

Use of coordinates has gone a long way toward bringing commonality to city maps, while at the same time providing the municipal government with an effective means of alerting all departments to any administrative changes, Davis noted.

"For example," he explained, "whenever street names are changed, or if streets are widened or even eliminated, that information goes into the GCMP data bank and is reflected on all subsequent maps of the area." In cases where, for example, streets have been eliminated entirely — and hence the addresses that would serve as coordinates — cross-reference data is supplied explaining where the addresses were, he pointed out.

Maps generated from this data base are plotted, according to Davis, using a California Computer Products, Inc. Model 7000 drafting system. The system, which features a Model 748 flatbed plotter that operates at speeds up to 42 in./sec, is in turn interfaced to a Univac V-74 minicomputer dedicated to this application.

"We started the program using the city's IBM 370, and some of our programs have yet to be converted to run on the V-74," Davis said. "However, we anticipate that all GCMP programs will be running on the dedicated system in the near future."

Of even greater significance, Davis said, is the use of GCMP programs and the maps generated from the Calcomp plotter as tools for city planning. "People here are just beginning to see the significance of this program;" he noted.

"With the high-speed plotter, we can show the incidence of fires, crimes or whatever, for a variety of time frames using one of many scales. All the information needed to locate new police stations, or other facilities, is right there. We will even be able to tell the public library system how many people in what area checked out books from which branches."

In addition to agencies of city government, the utility company supplying gas to the Atlanta area also participates in the GCMP program. Instead of data on library books or police beats, however, the utility provides the locations of its gas mains. This, too is referenced to the address and intersection centroids that form the basis of all maps printed by Davis' group.

"Dig-ins are always a problem," he said, explaining the participation of the utility. "One city agency or a utility digging up the streets might not know where pipes or mains were, since there were no common reference points.

"Several years ago we had a number of gas explosions resulting from improper dig-in," Davis said. "In one case we lost some houses; in another, a church."

Updates relating to the locations of these gas mains — or for that matter to any feature to be mapped — are incorporated into the GCMP data base using a Sanders Associates, Inc. graphics terminal. The V-74 then updates the data base, which is then transferred to the Calcomp plotter, and a map is run off for approval. Once approval has been granted, the master file residing on disk is updated, with all subsequent maps reflecting the change.

megastore

Zero RPM.
The Disk that doesn't Spin.

Megastore goes where a disk drive used to go.

More to the point, Megastore keeps going long after a disk drive quits. Without motors, bearings, heads or platters, there's nothing to wear out, burn out or crash. No moving parts.

Megastore is the astonishing new fixed-head disk memory replacement from Ampex that uses reliable cores instead of rotating media. In the long run it saves a lot of money.

Megastore provides increased throughput, increased system availability, increased system uptime and reduced maintenance costs. A vastly better return on investment.

Unplug your disk and plug in Megastore. You'll get a half-million to four million bytes of capacity (in half-megabyte increments) that your existing software can't tell from the disk it was designed for. The only difference you'll see is a major improvement in throughput, because Megastore has a data access time that's anywhere from 1000 to 3000 times faster than the disk it replaces.

Megastore. Ready now as a software-transparent replacement for Novadisk (Megastore 1223) and DEC's RJSO3/RJSO4 Disk (Megastore 11). Also available as Megastore 4666 for users who wish to provide their own controller. Other versions on the way. Contact Ampex Memory Products Division, 200 North Nash Street, El Segundo, California 90245. Phone (213) 640-0150. Ask for Megastore. The disk that doesn't spin.

AMPEX

Novadisk is a trademark of Data General Corp

SEE MEGASTORE IN ACTION AT NCC - WEST HALL, BOOTH 4113

COMPUTER
INDUSTRY
ACQUISITIONS
Multi-Client Study
For Proposal Call:
IDC
INTERNATIONAL DATA CORP
214 THIRD AVENUE
WALTHAM, MASS. 02154
1-800-225-8962

As Component Prices Drop

Micros Taking Over Auto Functions

By Tim Scannell
CW Staff

DETROIT — Microelectronics will account for 10% of the total cost of an automobile by the year 1990, according to a Ford Motor Co. spokesman. In fact, in 10 or 15 years, most functions of the automobile will be in some way controlled by a microprocessor.

"This is going to be a whole lot bigger than the automatic transmission," E.R, Karrer, Ford's vice-president of engineering, said. "If you did it today, it would probably be very expensive. However, all you have to do is look at calculators, digital watches and things like that to realize once you get into mass production, the cost just has to go down," he said.

Automobile manufacturers anticipate the industry will rely heavily on the use of computers and microprocessor chips in order to comply with increased government regulations on fuel economy and emission standards. "The fact is, in recent years the automobile has become subjected to restrictions and standards the industry never dreamed could come about," C.W. Snider, a group executive with the Chrysler Corp., noted.

Meet Every Requirement

"With design factors for fuel economy, safety, emissions and service written into law, we have lost all control over engineering tradeoffs" and as a result, "we have to meet every requirement," Snider remarked.

A microprocessor will virtually enable a car to monitor itself, Snider pointed out. "Signals sent to the instrument panel will alert the driver to any trouble — from an overheating engine, to running low on oil, to low tire pressure, dangerous brake line wear, and so on," he predicted.

Although critics say that automakers were hesitant to accept electronics, those involved with the industry claim this is an unfair indictment. "We think that microelectronics are actually more reliable and durable than some of the things in a car today simply because we can protect a chip against the elements by encapsulation or sealing it in epoxy," Karrer noted. "It has no moving parts, which makes it inherently more reliable than a device that does . . . such as a voltage regulator or solid-state ignition."

'This is going to be a whole lot bigger' than the automatic transmission.'

If anything, the electronics industry had to struggle to adapt to the standards of the automobile, according to John T. Auman, a senior engineer at the General Motors Corp. Microcomputers within an automobile must be able to function at below-zero temperatures and survive the stresses encountered on bumpy roads, Auman said.

Most car manufacturers purchase chips from "the big houses in the country such as Intel Corp., Texas Instruments, Inc., Motorola Semiconductor Products, Inc. and National Semiconductor Corp.," Karrer explained. "However, we do make the module that contains the chip."

Microprocessors are used to a great extent today in diagnostic analyzers and troubleshooting equipment. An Electronic Engine Performance Analyzer developed by Chrysler can check 60 different engine functions in less than four minutes and supply a printout of instructions telling the mechanic what unit or module to replace in the automobile, Snider said.

An alphanumeric display on the console of the analyzer guides the service technician step-by-step through each automotive test, so little training is required in the computer's use. The console displays the test results and identifies any component not meeting specifications, Snider explained.

Already in Use

The use of computers, in general, is not entirely new to the automotive industry, a spokesman said. Analog processors have been installed in Chrysler, General Motors and Ford cars since 1977 and are used to regulate the firing of spark plugs, adjust spark timing according to engine temperature and altitude and monitor the rate at which exhaust gases are recirculated to cut down on the amount of nitrogen oxide emissions.

Some manufacturers use microprocessors to control the motion of windshield wipers, pausing them every so often for those bothered by squeaky blades, the spokesman added.

Industry analysts doubt, however, that people will ever see the day when an automobile is totally controlled by a computer to the point of eliminating the need for driver intervention. "This type of operation would take you almost into the problems (you might face) in total mass transit," Karrer observed. "You can't do it alone because it must be done with special roads and that sort of thing."

Heath Answers User Questions on Its H8

By Frank Vaughan
CW Staff

BENTON HARBOR, Mich. — In its maiden issue, *REMark*, the official magazine for users of Heath Co. computer equipment, provided a forum for that firm to answer several popular questions concerning the H8 microcomputer.

Many hobbyists have challenged Heath's use of the 8080 microprocessor in its H8, feeling that the faster Z80 would have been a better choice. In responding to that question, a Heath spokesman noted that "in early 1975 when the development of the H8 started, the two primary 8-bit microprocessors that were available were the 8080 and the 6800.

"We chose the 8080 over the 6800 because it was lower in cost, had more second sources and was far better documented. In addition, there was far more software available for the 8080 than the 6800. Since software is the key to getting practical value from a digital computer, the software issue was probably the most important. The 8080 won," he explained.

In addressing the Z80 question, the spokesman noted, "When H8 development was starting, the Z80 had not been announced and was not available. In fact, it was totally unknown and, as a result, was not among our available choices. When the Z80 appeared on the scene, there had been far too much time and money invested in both hardware and software development to abandon the 8080."

Another area of interest to hobbyists has been Heath's bus structure. Heath has adopted a 50-line bus, in contrast to the popular S100 bus. When the H8's development began, the Mits Co. Altair computer had just been announced. This computer uses a 100-line bus design that has since become a de facto standard in hobby and personal computing. At that time, no other competition was around, the spokesman explained, and the 100-line bus design was not as well-known as it is today.

Heath engineers evaluated the S100 bus design and determined that it was not suitable for Heath's use because it was obsolete, expensive and far larger than required. Heath feels its 50-line bus is lower in cost, cleaner electrically and easier to interface. The bus has been placed on the side to take advantage of convection cooling.

In explaining why octal notation is used instead of hexadecimal, the spokesman said that for one thing, the 8080 machine language instructions are formatted in octal notation. Another reason for using octal is that most people feel it is easier to understand than hexadecimal. In addition, Digital Equipment Corp. used octal notation with the LSI-11 microcomputer and "we felt that it was desirable to use the same notation on both the H8 and H11 computers."

The octal vs. hexadecimal discussion will never be fully resolved, he said, noting that many individuals simply favor one system over another because they are used to it.

"Our position here at Heath is that an individual professionally or avocationally involved with computers would be able to use octal or hexadecimal notation equally as well. There is no particular handicap or benefit to either system," he suggested.

REMark is available through the Heath User's Group located on Hilton Road, St. Joseph, Mich. 49085.

Board Emulates Any Mini, Micro

VAN NUYS, Calif. — Dynamic Sciences, Inc.'s T-1000 is a single-board computer that can be microprogrammed to run the instruction set of any minicomputer or microcomputer, according to the firm.

The board's bipolar construction and byte slice architecture permit speeds in the 300,000 operation/sec range, while allowing the board to emulate computers with 8-, 12-, 16- or 32-bit word lengths, a spokesman claimed.

The board's processor contains 16 full word (16-bit) hardware registers, and up to 64K words of memory can be directly addressed with 256K words of extended addressing available. The board operates on a single +5V power supply.

The board derives its emulation control from a 1K by 32-bit microprogrammable memory, the spokesman explained.

Additional memory, programmed I/O, interface and data option modules are available on additional boards.

Prices for single quantities start at $2,500, depending upon the computer that is being emulated, while prices of quantities of 100 or more begin at $1,000 from the firm at 7660 Gloria Ave., Van Nuys, Calif. 91406.

P

PARITY BIT — 1. The parity bit is used to check that data has been transmitted accurately; a receiving device counts the "on" bits of every arriving byte. If odd parity is specified, an error condition will be flagged any time an even number of "on" bits are detected, since at least one bit must have been lost or gained in transmission for an even number of "on" bits to remain. 2. A binary digit appended to an array of bits to make the sum of all the bits always odd or always even.

PEN LIGHT — A pen-like device with a light on the tip used with a CRT.

PERIPHERAL EQUIPMENT — 1. Units which work in conjunction with a computer but are not a part of it (e.g., tape reader, analog-to-digital converter, typewriter, etc.). 2. In a data processing system, any equipment, distinct from the central processing unit, that may provide the system with outside communication or additional facilities. 3. The auxiliary machines which may be placed under the control of the central computer. Examples are card readers, card punches, magnetic tape units and high-speed printers. Peripheral equipment may be used on-line or off-line depending upon computer design, job, requirements and economics.

PERIPHERAL INTERFACE ADAPTER (PIA) — Some microprocessors have incorporated LSI devices exclusively dedicated to enhance their I/O capabilities and thus simplify the interfacing task of the design engineer. For example, several firms provided microprocessors with special peripheral interface adapters that act like a universal I/O interface. The typical PIA offers two eight-bit, three-state buses to interface with peripherals, along with the ability to service four independent interrupt lines. The unit also provides handshake control logic signals for synchronizing I/O devices to the microprocessor.

PLA (PROGRAMMED LOGIC ARRAYS) — 1. A PLA is an orderly arrangement of logical AND and logical OR functions. In application they behave very much like a glorified read-only memory (ROM), but PLA is devoted primarily with a combination logic device. 2. A PLA is an alternative to ROM which uses a standard logic network programmed to perform a specific function. PLAs are implemented in either MOS or bipolar circuits.

POINTER — 1. A word giving the address of another main memory storage location. 2. Pointers automatically step through memory locations. Automatically stepping forward through consecutive locations is known as autoincrement addressing; automatically stepping backward is known as autodecrement addressing. These modes are particularly useful for processing tabular or array data.

LEARNER'S LEXICON

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd Used with permission of Matrix Publishers, Inc. 207 Kenyon Road, Champagne, Ill. 61820

COMPUTERWORLD

DO YOU QUALIFY?

OUR PRODUCT WAS DESIGNED FOR THE VANGUARD OF THE COMPUTER INDUSTRY. SOPHISTICATED USERS RECOGNIZE THE VERSATILITY OF OUR MACHINE AND HAVE BEATEN A PATH TO OUR DOOR.

We've installed our revolutionary computer system, the QM-1, in Fortune 500 Aerospace Corporations, Universities, the Military, major System Houses and in a giant Computer Manufacturer.

They purchased our system because:

- The QM-1 was specifically designed to enable you to emulate any computer or, for that matter, any peripheral or digital device.
- When an emulator is running, the QM-1 architecture is transparent to the user. Software developed on the QM-1 will run on the machine which has been emulated. The opposite is also true; application and system software from the "real" machine will run unchanged on the QM-1.
- QM-1 customers have emulated commercial, militarized, avionic and special purpose computers. They range from micros to fourth generation Large Scale General Purpose Systems.
- Users are not limited to one system identity; they can emulate as many kinds of computers as they like, even run multiple emulations of different systems concurrently.
- The QM-1 allows you to contol and monitor the emulated system, even primitives like gates, data busses and registers. You can use it to design new computers.

Here's what QM-1 users have found to be true:

- Emulators on the QM-1 are running one hundred times faster than simulators on more expensive systems.
- The QM-1 is an easily modified, reusable breadboard to verify and validate device design.
- The QM-1 is without equal as a software development tool for any computer. It will also protect investments in software running on destandardized machines.
- The QM-1 is an excellent design tool for analyzing software structure, system composition and hardware/software trade offs.
- The QM-1 is ideal in a computer science environment for instruction and research into hardware and software architecture.

Prices range from $190K for a minimum system configuration, capable of running Nanodata supplied software, to upwards of $700K for a multiprocessor. A "typical" customer configuration sells for $280K and includes emulators of the PDP 11, Data General NOVA, IBM 360, etc.

Do you qualify as a prospective user? If you do, then write for additional information or, better still, call Michael Senft, Director of Marketing.

NANODATA CORPORATION
2457 Wehrle Drive • Williamsville, N.Y. 14221 • (716) 631-5880

Show and Tell.

The Show:

The Exposition. Your chance to hold a one-to-one consultation with hundreds of representatives in the know from the nation's top manufacturers. You don't have to travel all over. They're coming soon to a city near you.

And the Show is free! Including exhibitor seminars and demonstrations of the latest developments in:

Data Communications Terminals • Software • Minicomputers • Data Input Equipment • Computer Output Equipment • Supplies • Magnetic Media • Modems • DP Education • Small Business Computer Systems • Flexible Disk Drives • Data Communications Interconnect Equipment • Mini-peripherals • Magnetic Tape Transports • Cassette Systems • Power Supplies • Printer Terminals • Keyboards. And more.

Ask your questions. State your needs. Discuss your plans. This low-key, non-selling atmosphere is your chance of the year to compare what's on the market, all in one place. As sophisticated or as simple a show as you need. You're the center of attention, whatever your level.

You're important enough to bring top people from all over the country to you.

Here are some of the companies who will be looking for you!

NCR
Varian Graphics
Informatics
Honeywell
Datamation
Communication News
McCormack & Dodge
Data Rentals
Computer Sales International
Intel
Electronic Ventures
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing
S.E.A.
Tri-Data
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems
Shaste
Mostek
DIVA
SBC Magazine
Tele-dynamics
Control Data
National Semiconductor
Printronix
Codex
Leer Siegler
E M & M
The Morley Company
Vanier Graphics
Total Typography
Weng Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Inforex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Informer
Computer Decisions
Infosystems
T-Bar
Corporate Systems
YE Data
Arcus
St. Louis Info
Digilog
Computerworld
NCI
AT&T
Kodak
BASF
IBM
Anderson Jacobson
Computer Input Services
Paradyne
ComData
Gehesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service
Itel Corporation
Deltak
Peripheral Products
General DataComm Industries
Continental Peripherals
Computer Associates
Qentel
Dieblo Systems
Marketechs
Recel-Milgo
Data Systems Specialists
Key Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
McGunn Safe
Allstete Computer
H/G Professional Forms
Nichols & Company
Datapro
Input Services
Plessey Services
Industrial Computer Controls
Vincent Data Products
World Info Systems
DP Power
Conrac
Educational Data Systems
Cybertek
Cosmic
Business Automation
Insyte Datacomm
Herrera Kirby
Foto-fun
Hamilton Sorter
Dispotech
Trac Associates
Sperry Univac
Xerox
Sykes Datetronics
Cummins Allison
American Microprocessor
International Data Corp.
Programs, Inc.
Beehive International
Intertec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tendem Computer
PCC/Pertec
Computrend
Extel
Mentel
Sycor
Digitronics
Computer Services
Detemert
Courier Terminals
Modems Plus
Software Design
Curtis 1000
Spectron
K&K Associates
Applied Digital Data
Epic Data
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathemetice
Rienda Electronics
Computer Corp of America
Cullinene
Hewlett Peckerd
Pensophic Systems
Dynetech
Western Union
Calcomp
General Computer
Atlantic Research
Telefile Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments
Consolidated Computer
Cybersearch
Wolfe Computer

The Tell.

The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. Well-known authorities – consultants and users – will share experiences, ideas, insights and foresights with you:

Here's what the Conference includes:

Tuesday

The Executive Briefing.
A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday (Two simultaneous conferences)

Managing People Problems.
A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Small Business Systems.
A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

Thursday

Distributed Data Processing.
A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Here's the Computer Expo 78 Schedule:

HOUSTON Southwestern Computer Expo	April 11, 12, 13 Astrohall
ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

COMPUTER CARAVAN'S
COMPUTER EXPO 78

Register now!

For the show: The Exposition is free. No advance registration is required for the Exposition. Your business card will admit you.

Exposition hours – 10 AM–5 PM.

For the tell:
The Conference is just $55 per single day, only $135 for all three days.

You can register on-site.

For SBC-80, BLC-80

Datacube Adds Video Board

READING, Mass. — Datacube/SMK-I has introduced a video terminal board that interfaces directly to Intel Corp. SBC-80 and National Semiconductor Corp. BLC-80 series microcomputers.

The Datacube VT-103 is bus-compatible with both microcomputers and provides a 90-character Ascii subset in 7 by 9 font on a 64-character, 10-line external monitor, a spokesman said. The board is addressed as an I/O device and programming is switch-selectable. The board features direct cursor addressing and 11 other cursor control functions. Composite and direct drive video outputs are also available, the spokesman said.

The VT-103 has an input port for an optional external keyboard. Use of the keyboard can replace teletypewriters or other terminals in many applications, the spokesman claimed.

Inputs for a strobe and seven data lines are provided at a 26-pin printer circuit edge connector.

The terminal board costs $450, $275 in quantities over 100. Other quantity discounts are available from the firm at 670 Main St. Reading, Mass. 01867.

Shows Scheduled From Coast to Coast

Following is a listing of all the significnat microcomputer shows whose managment has notified *Computerworld* of the dates. The microcomputer show business is highly volatile, and hobbyists should contact show managers before making firm plans to attend:

April 22-23, Trenton, N.J. — **Third Trenton Computer Festival.** Contact: Amateur Computer Group of New Jersey, UCTI, 1776 Raritan Road, Scotch Plains, N.J. 07076.

April 28-30, Long Beach, Calif. — **Percomp '78.** Contact: James H. Lindwedel, Royal Exposition Management, No. 108, 1833 E. 17th, Santa Ana, Calif. 92701.

June 5-8, Anaheim, Calif. — **National Computer Conference & Computer Festival.** Contact: Steve Miller, SRI International, 333 Ravenswood, Menlo Park, Calif. 94025.

June 23-25, Detroit — **Macc Computerfest '78.** Contact Jim Rarus, Semco, Box 9578, North End Station, Detroit, Mich. 48201.

Aug. 25-27, Philadelphia — **Personal Computing '78.** Contact John Dilks, Rt. 1, Box 242, Mays Landing, N.J. 08330.

Sept. 15-17, New York — **Second National Microcomputing Exposition and Conference.** Contact: H.A. Bruno & Associates, Inc., 78 E. 56th St., New York, N.Y. 10022.

Oct. 5-8, Chicago — **Second Midwest Personal Computing Exposition.** Contact: Louise Garcia, 1435 Rio Rancho Drive, S.E., Rio Rancho, N.M. 87124.

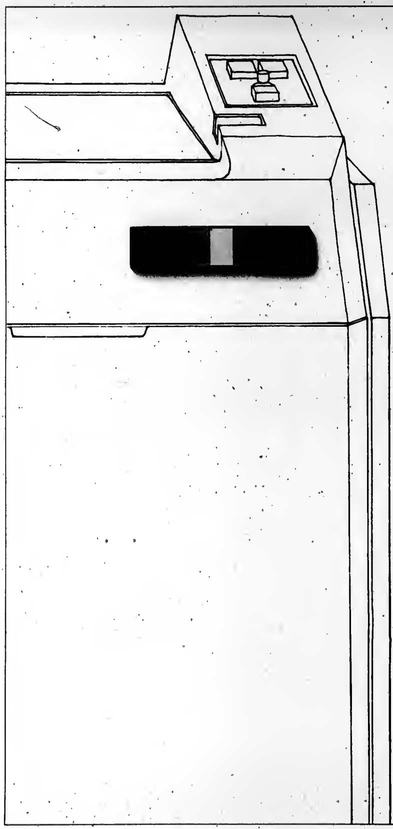
Oct. 12-15, Chicago — **1978 Mid-America Personal Computer Show.** Contact: International Personal Computer Shows, Inc., P.O. Box 844, Greenwich, Conn. 06830.

Nov. 3-5, Los Angeles — **Third West Coast Computer Faire.** Contact: Jim Warren, The Computer Faire, P.O. Box 1579, Palo Alto, Calif. 94302.

Hobby clubs or schools planning smaller, regional microcomputer shows may contact *Computerworld* at 797 Washington St., Newton, Mass. 02160, to have their shows listed in a regional listing.

Mini Course Introduction to Computers
SUGGESTED COURSE FEE $22

'It Is "Suggested" You Pay or You Won't Get Into the Course.'



It's true that one printer/plotter looks pretty much like another.

But do you know what distinguishing mark appeared on the first one?

In 1967 Varian's nameplate went on the world's first electrostatic printer/plotter. And now, a decade later, it's still at the front with probably the most accurate and reliable unit around.

Several exclusive features have kept us there: Like an automatic concentrate-add package for consistent black and white. Like 1800 lines per minute printing and four inches per second plotting on an 11 inch machine. And 128 characters (upper and lower case, plus scientific symbols) in it's hardware character generator. Standard, not optional.

The others may look a little like us. But we're the only one that's pure Varian: Solid, dependable, here to stay.

varian

P.S. We also have some new things to show you at NCCI

I'd like to know more from the ones who started it, so .

☐ Please send "Printer/Plotter Considerations", an overview of the current state of electrostatics.

☐ Please have a sales engineer call to arrange for an appointment.

☐ Please keep me on your list for future updates and mailings.

Name ____________

Address ____________

City/State/Zip ____________

____

Phone ____________

Varian Graphics Division
611 Hansen Way
Palo Alto, CA 94303
(415) 494-3004

155-II
Up to two megabytes with DAT.
Sale or Lease
COMDISCO
312-698-3000

Fill out and mail this self-addressed postcard.

☐ Please send me more information on:
☐ Have someone call me about:
☐ UCC ONE (Tape Management Software)
☐ UCC TWO (DUO, DOS under OS)
☐ UCC THREE/ADAM (Disk Management System)
☐ UCC SIX (PDS Space Management)
☐ UCC TEN (IMS Data Dictionary/Manager)
☐ UCC FIFTEEN (Job/Recovery Management System)
☐ UCC FCS (General Ledger/Financial Control System)

Name
Title
Company
Address
City/State/Zip
Telephone
Hardware

UCC
UNIVERSITY COMPUTING COMPANY

First Class
Permit No 13443
Dallas Texas

BUSINESS REPLY MAIL

No postage necessary if mailed in United States

Postage will be paid by

UCC
UNIVERSITY COMPUTING COMPANY
Customer Relations
P O Box 47911
Dallas, TX 75247

Computerworld' CW-478

[illegible]

TAPE [illegible]: UCC ONE's 700 [illegible] % of all [illegible] UCC ONE manages your [illegible] valuable data from loss or destruction. It provides real-time tape status. Eliminates costly, handwritten records and the expensive mistakes they breed. Gives you better control and greater efficiency.

DOS UNDER OS: UCC TWO lets you continue to use your DOS programs — without reprogramming — while you convert to OS. You plan the conversion or consolidation to fit your work schedule, instead of the other way around. You can consolidate your DOS operation into your OS/VS environment today. Or, you can spread the conversion — and the costs — over months. UCC TWO is the best path to OS and 500 users have proven it.

DISK MANAGEMENT: UCC THREE/ADAM solves the problem of inefficient DASD space usage. Based on user specifications, it automatically scratches unneeded, unused and invalid data sets. Or it will migrate the data sets to tape, based upon any combination of criteria — such as usage frequency, size and retention period. Then, UCC THREE keeps the problem from [illegible] controlling data set allocation. [illegible] used to [illegible] Accurate reports on your current space utilization are produced.

PDS SPACE MANAGEMENT: UCC SIX is the only software package that eliminates PDS compression — because it automatically inventories and controls PDS disk space. It spells the end for ABENDS and "dump and restore" operations caused by exhausted PDS disk space. You even save money on your disk investment, too.

IMS DATA DICTIONARY/MANAGER: UCC TEN is the standard IMS dictionary, with more installations than the Program Product offered by its nearest competitor. Not only does UCC TEN give you superior control over your data base environment, it also defines your data communication network, produces 3270 screen formats and generates IMS Stage I SYSGENS. Now, at last, you can get the benefits you expected from IMS.

JOB RECOVERY MANAGEMENT: UCC FIFTEEN lets you restart at the proper job step — instead of at the beginning. The OS catalog is corrected, unnecessary direct access data sets are deleted, and GDG bases are properly altered for the rerun. Automatically — so manual errors in restarting and rerunning are eliminated.

FINANCIAL SOFTWARE: The UCC General Ledger/Financial Control System is the most advanced and complete system of its type. Full general ledger accounting. Budgeting. Cost allocation and profit center reporting. It can generate over 100 standard reports. Plus, it has an easy-to-use report writer that the Accounting Department can use — with a minimum of EDP assistance.

SUPPORT: It takes more than code to make a good software product. It takes dependable, long-term maintenance and support of these products. And support is just one more way that we're helping the computer to do more of the work in more than 2500 separate installations.

UCC

USA: P. O. Box 47911
Dallas, Texas 75247
Canada: 101 Duncan Mill Road
Don Mills, Ontario M3B 1Z3
Europe: 1258 London Road
London, U.K. SW16 4EG

CALL 1-(800) 527-3250 OR MAIL THIS CARD.

☐ Please send me more information on:
☐ Have someone call me about:
☐ UCC ONE (Tape Management Software)
☐ UCC TWO (DUO, DOS under OS)
☐ UCC THREE/ADAM (Disk Management System)
☐ UCC SIX (PDS Space Management)
☐ UCC TEN (IMS Data Dictionary/Manager)
☐ UCC FIFTEEN (Job Recovery Management System)
☐ UCC FCS (General Ledger/Financial Control System)

Name____________________

Title____________________

Company____________________

Address____________________

City/State/Zip____________________

Telephone____________________

[illegible]

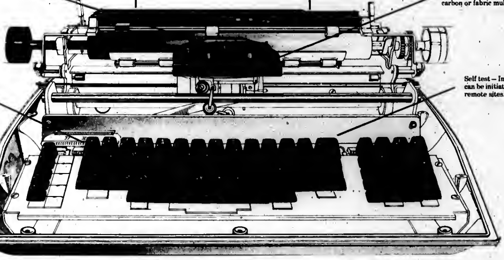
Front panel accessibility – All the normally used operator controls are organized into functional groups and logically arranged for maximum operator convenience.

Baud rate switch – Switch from 110, 150, or 300 baud to 600 or 1200 baud transmission easily. Just flip the convenient switch and the terminal easily adapts to your communication speeds.

TwinTellect™ option – Want to use a special printwheel? Just switch on TwinTellect when you install the printwheel. Sprint 5 electronics provide the coordination between code and print characters. Available only from Qume.

Dynamic positioning – Create graphs or justify your text easily. With switch selectable 10 or 12 characters per inch spacing. Plus controlled spacing of 1/120" horizontal and 1/48" vertical.

Introducing the smart daisywheel terminal designed especially for the computer industry.



Smart microprocessor logic – You get flexible character spacing, precise plotting resolution, and smart multi-direction carriage slewing. Not to mention high quality printing. Fast.

Serial or parallel interface – Sprint 5's can provide a standard serial RS232C interface to your system. In addition, the keyboard version is available with DC current loop interface, and the printer version is available with DC current loop or parallel interface.

Interchangeable character sets – We have over 50 different character sets and typestyles. They're easy to change and include international characters, APL, and scientific symbols.

Multicolor ribbons – over 15 different ribbons (10 color choices) to color your messages. Easy to handle cartridges with carbon or fabric multicolor ribbons.

Comprehensive command set – 59 powerful user oriented commands provide format flexibility. And to make it even easier, commands are printed on the keycaps.

Self test – Internal self-diagnostic routines can be initiated from the keyboard or from remote sites.

It's called the Sprint 5. And it's from Qume.

That's right. Qume.

We've established quite a reputation in the word processing business. A reputation for letter quality print. And because of that, we didn't want to simply attach a keyboard to a printer and present it to the computer industry as a full blown terminal.

So we designed our Sprint 5 daisywheel terminal from the ground up to meet the needs of the computer industry. Complete with our famous print quality. And 55 cps.

Qume's smart microprocessor gives the Sprint 5 many capabilities not found in conventional terminals. Such as a powerful command set, self-diagnostics, memory storage of tab settings, and forms control programs.

Surprisingly enough, however, the Sprint 5 costs no more than competitive terminals.

Obviously, a product that does much more but costs no more is a better buy.

And when all is said and done, that may be Sprint 5's most outstanding advantage.

For further information on how the Sprint 5 can give your computer letter quality output, contact: Qume Corporation, 2323 Industrial Parkway West, Hayward, CA 94545 or phone Lee Cannon, (415) 783-6100, Extension 338.

Qume®
the printed word

CI Notes

DP Credited With Aiding Favorable Trade Balance

WASHINGTON, D.C. — The favorable balance of trade for office, computing and accounting machines (including copiers) in 1977 marked a 27.1% increase over 1976, according to statistics recently released by the Computer and Business Equipment Manufacturers Association (Cbema).

The Cbema statistics, compiled from U.S. Department of Commerce data, indicated a $2,349,840,118 favorable balance of trade for the industry, which is an increase of about $500 million over the 1976 year-end figures.

Total exports were up from $3.2 billion to $3.9 billion and imports rose from about $1.35 billion to more than $1.6 billion in 1977 over 1976. About 21% of the increase in exports was attributed to an increase in sales of DP equipment.

In addition, the ratio of exports to imports for 1977 was 2.46.

Cary Gains Chairmanship Of The Conference Board

NEW YORK — Frank T. Cary, chairman of the board of IBM, has been elected chairman of The Conference Board, a nonprofit business and economic research organization. Cary will serve until the next regular election of Conference Board officers at the annual meeting in September.

Cary succeeded G. William Miller, who resigned as Conference Board chairman upon appointment as chairman of the Federal Reserve Board. Cary has served as a trustee of The Conference Board since 1974 and last September was elected co-chairman of the organization.

Supershorts

The Western Electronics Manufacturing Association (Wema), largest electronics trade association in the U.S., changed its name to American Electronics Association effective March 1. The group has a membership of more than 900 firms in the electronics industries nationwide. E.E. Ferrey, president, forecast that membership will exceed 1,000 companies by the end of 1978.

Time Ripe for IBM Move Toward Breakup: Analyst

By Don Leavitt
CW Staff

CHICAGO — For a variety of reasons, IBM has been evolving into a corporate structure quite different from that of the late 1960s. This may mean the environment is right for IBM to approach the Department of Justice with an antitrust settlement plan, according to the vice-president for institutional research at E.F. Hutton & Co., Inc.

Speaking here recently, Thomas J. Crotty said the month-long break expected after the government completes its case in the U.S. vs. IBM trial would be a natural time for such an approach "if it hasn't taken place already."

At that time, if the government doesn't gain a directed verdict against the company, Justice attorneys will be in a "no-win" situation, only able to defend the current trial record without adding any new evidence, he said.

In effect, the government then will only be able to run "guerilla actions against IBM" and they would be of nuisance value only, he told software industry executives gathered in conjunction with the International Computer Programs, Inc. "Million Dollar Awards" ceremonies.

The IBM overtures, which will probably lead to a settlement even if nothing is announced in the near-term future, will outline a "breakup" plan similar to several suggested by various observers before the case went to trial, Crotty said.

But, he added, the logic behind the proposal now is as much to help the company maintain its own growth as it is to resolve the antitrust situation. In effect, IBM may well tell Justice: "Here's our plan; we're going to follow it even if you can't accept it and insist on continuing the trial," according to Crotty.

Like GM Structure

The company's evolution has been toward a "General Motors type of organization" with competing divisions, and essentially IBM will offer to carry that one step further, setting up a holding company and five subsidiaries, all wholly owned but all operating

(Continued on Page 60)

Users See Series/1 as Bridge To IBM 380, Survey Reveals

SAN JOSE, Calif. — Users apparently view the Series/1 from IBM as much as a bridge to the next generation of IBM equipment as a stand-alone minicomputer, according to a report from SBS Publishing here.

The report, based on user surveys, revealed that IBM 370 users approaching their capacity limitations are viewing the Series/1 as the logical intermediate step before moving to the IBM 380.

The Series/1 is viewed as both a means to improve the performance of a network centered on a 370 and a versatile tool in its own right, the report said. This tool allows users to optimize the performance of their DP function on a company wide level.

The IBM investment in the Series/1 was minimal at its introduction, but has since multiplied to the point where industry observers feel the system is one of the best to be offered by IBM, SBS said.

This versatility shows itself in many ways, not the least of which is the wide range of applications and the diversity of configurations in which the Series/1 is used, the firm added.

Originally Tools-Only

Originally introduced as a tools-only product, the Series/1 has been reinforced by IBM in a number of areas, including the introduction of three major operating systems in a 14-month period. The system software is, of course, the key to successful integration with other computer systems.

In terms of the displacement of other equipment by the Series/1, the report stated that while a significant segment of replaced equipment was IBM gear, an equal percentage of displaced equipment belongs to competitors such as Digital Equipment Corp., Computer Automation, Inc., Sanders Associates, Inc., Singer and NCR Corp.

The report is available for $175 from SBS Publishing, Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

TI745's, 743's, 765's, and 763's
IN STOCK!!!

Single Source—Coast to Coast ☐ Fast Delivery—Nationwide
National Service—Our Own Experts ☐ Low Cost—Big Savings

Believe it or not, Data Access Systems, Inc. has *hundreds* of portable data terminals available for fast delivery, with stocking points and service nationwide. Don't wait for promises, we are TI's largest data terminal dealer. We also stock DEC's LA36, LS120 & LA180; Diablo's 1620 & 1641; Lear Siegler's ADM 1, 2 & 3 and the Teletype 43. Compare suppliers for product, price, delivery and service; you'll come to **"The Data Terminal People."**

Call your local district office,
or toll free numbers: East 800-631-9604 West 800-227-4406

DAS
"THE DATA TERMINAL PEOPLE"
Data Access Systems, Inc.

Corporate offices:
400 Route 46, Mountain Lakes,
N J 07047 • (201) 335-3322
or Toll Free (800) 631-9604

District offices:
Boston — (617) 933-8822
Washington, D.C. Area — (703) 525-2923
Phila. So. Jersey — (609) 854-0070
Chicago — (312) 298-0777
Los Angeles — (213) 538-4100
San Francisco — (415) 391-5535

International News

Korea Struggling: 'Make or Buy or Assemble?'

By Bill Orr
Special to CW

The South Korean economy has been booming and the country's leaders increasingly realize rapid modernization also means rapid computerization at all levels of economic life.

The government has projected a robust 20% annual growth rate in computers over the next eight years. By 1986, South Korea expects to have 6,300 computers installed at a total value of some $340 million.

This is the first of two articles looking at the present state of computing in South Korea. This week Orr covers government activities; next week's article will focus on some large users.

A still-open question is: Will South Korea follow the Japanese example and develop its own computer industry?

The alternatives being actively debated are whether to continue reliance on foreign suppliers (mostly U.S. and Japan) or to function as a "systems house" — buying components from OEMs and doing the hardware integration and system software.

Government researchers looked closely at the costs of acquiring computer systems under these alternatives. They considered not only the visible costs, but also "hidden" costs such as government subsidies. The conclusion was that a $330,000 purchased system could be made in South Korea for $40,000 or assembled from components for $80,000. A larger $550,000 system could be made for $70,000 or assembled for $180,000.

This analysis indicated South Korea can manufacture a computer system for about one-eighth the cost of purchasing it outright, or it can assemble the system from OEM components for one-fourth to one-third the purchase price.

For some, this analysis clearly favors a "made in Korea" policy. Others would prefer not to divert scarce technical talent and manufacturing resources from highly successful export industries and more pressing domestic needs.

In exports, which have grown at a 40% annual rate over the past 15 years, the momentum is strongly in the direction of heavy machinery — steel and cement plants, oil refineries and supertankers. By 1981, about half of South Korea's exports will be in-heavy machinery.

"Why change a winning combination?," runs a convincing argument of those who oppose a national plunge into the expensive uncertainties of the world computer market.

Obviously, the outcome of these ongoing policy debates will have a sharp impact on the local computer marketplace.

No one expects South Korea to venture into manufacturing large computers. But a proposal to produce minicomputers has been on the drawing boards for more than a year. If this becomes policy, the long-run prospects for foreign mini suppliers will drop overnight from extremely good to extemely poor.

The Koreans aren't opting out of the world computer market altogether. A technical consensus is forming around the policy of developing software as an export product. South Korea needs a strong software capability for its internal development anyway, so it's not such a big step to add complete software systems to the process plants it exports.

Trend to Minis

Computerization in South Korea is a recent development. The country's first computer, an IBM 1401, was installed in 1967 for econometric computations. Over the next decade, a total of 140 systems were installed with an average value in the $300,000 range.

By 1986, the end of the third Five-year Plan, the average value will have dropped to $54,000. This projection reflects the accelerating shift to small computers and minis that began in 1975.

Except for the big trading companies and a few large banks, business in South Korea is the domain of hundreds of small establishments. Most are managed by proprietors using manual methods. Helping to bring these managers and their methods up to competitive levels is one of the main missions of Dr. Young W. Kim, director of information industry in the Ministry of Science and Technology (Most).

Most has a dotted-line relation to the Korea Institute of Science and Technology (Kist), a 10-year-old "center of excellence" dedicated to the same end — modernizing the South Korean business establishment. Within Kist, Dr. Ki Soo Sung sets the national pace for computer development in his Software Development Center.

The staff is task-oriented, taking on jobs that require leading-edge technology or are ot critical national importance. Among its accomplishments:

- Programming impact printers to print Hangul, the Korean phoenetic alphabet.
- Computerizing the national telephone billing system, replacing 300 keypunches with a stand-alone optical character reading system.
- Introducing time-sharing to managers of companies of all sizes in all sections of the country.

Kist has South Korea's most powerful computer installation, topped by a Control Data Corp. Cyber 73/18. Along with batch processing for its business and government clients, the Kist systems support a nationwide network of more than 40 time-sharing terminals.

Kist is in the midst of a major upgrade of its CDC system to three times its present price/performance ratio. The decision will come after months of benchmarking, designed by Kist to nullify the built-in advantage of incumbent CDC. In what started out as a crowded field of contenders, the finalists are CDC (Cyber 174 or 175) and IBM (3032).

Like everybody else in time-sharing, Sung is unhappy with the cost of data communications, which for Kist's users equals the rental for terminals. Communications, both voice and data, have a high priority in the government's modernization program.

IBM Move Toward Breakup May Be Near, Analyst Says

(Continued from Page 59)

at arm's length from one another, he said.

One of the subsidiaries will build and sell mainframes on both the international and domestic markets. A second will combine the current Office Products and General Systems divisions into an "Office Systems Division," a phrase already heard in the "hallowed halls of Armonk," according to Crotty.

Next on Crotty's list is a "general products" subsidiary that will focus on peripheral devices and might include some that would attach to non-IBM mainframes. Instrumentation might be provided by this unit, Crotty said, noting that IBM has already developed a medical system for the National Aeronautics and Space Administration.

An IBM communication corporation, with Satellite Business Systems as a subsidiary, would be strong enough "to go right at AT&T" and if that happens it would certainly be "the singularly most important aspect" of this view of IBM's future, the researcher continued.

A move into the service business then would be too expensive, Crotty judged, but by 1981, when the SBS satellite is aloft, the economics will have changed and that's when this unit of the new IBM may make its entry.

The final subsidiary Crotty expects to be in IBM's offer to Justice would be there largely to meet an expected government demand rather than any particular desire of the company, he said. This would be an IBM acceptance corporation — "much like GMAC" — that would handle most of the financial "paper" for the computer industry.

Introducing the $3890

Meet Lear Siegler's Dumb Connection™ Peripheral Package.

At first glance, it might seem a lot to pay for a cable. But when you consider that it comes connected to the Dumb Terminal™ on one end, and to the Ballistic™ Printer on the other, it becomes a pretty smart buy.

From a single source, you get the world famous video terminal, the Dumb Terminal, and hardcopy from Lear Siegler's new Ballistic Printer.

The Dumb Terminal is, of course, that same reliable terminal, with loads of standard features, that specializes in dependable performance with a minimum of frills.

Our new Ballistic Printer is designed for heavy duty applications. Thanks to its unique head design, it'll give you output

Approaching Large System Volume

Business Uses Seen Boosting Micro Shipments

LOS ANGELES — Spurred by increasing use in business applications, microcomputer shipments may soon equal total shipments of large computers during the past decade, an industry executive predicted here recently.

Ryal R. Poppa, chairman of the board, president and chief executive officer of Pertec Computer Corp. told an audience at the Financial Analysts Federation Symposium on High Technology that the very small business systems segment "is assuming the role of growth leader in the computer industry." Small businesses today are finding they can get more computing power for less money — and also operate them for less — than they ever could with larger systems, he claimed.

"This acceptance of microcomputers — more popularly known as personal computers — is expected to take this part of the computer industry from a projected sales level this year of $398 million to 1983 sales rates of more than $1 billion, largely on the strength of affordability to the small businessman," he said.

"Most of the technology to meet the needs of the corner drug store, regional hardware chain or cotton gin farmers is already in place — or ready to be introduced," Poppa said.

"Intelligence on a semiconductor chip and low-priced peripherals are available. Complete systems are being built into desks, and by year-end there will be even further reductions in system size, giving even more for less," he predicted.

"The price of such a computer, including the vital software to make it run, is around $15,000 for the average installation today. But that price is declining and the $10,000 system should be common in 1979," he said.

"Software requirements are also ready. Since 1975, some 20,000 Mits/Altair systems have been sold and put into operation. Those buyers — many of them home hobbyists — did some original software programming and are now making it available to end-users and manufacturers," he noted.

As a result, all of the pieces are in place for a revolution that will more than match — unit for unit — the number of computers that have been installed in the past decade.

Poppa predicted that this unit-for-unit doubling could come in as little as eight years, if the "technology of matching user need to equipment capability is developed at a rapid rate.

"Small businesses won't be able to afford not to use computers in the very near future. These microcomputers will become versatile, personal business tools, as much a part of running a business as the cash register and the telephone.

"The marketing challenge lies in reaching companies with annual sales in the $200,000 to $5 million range through retailers whose own sales are at those same levels," he said.

Pertec, which supplies 55 stores dedicated to only Mits/Altair products and some 250 other outlets that carry Icom and other product lines, expects to double its own market channels over the next 18 months.

Typically, retail dealers need an inventory of $75,000 to $150,000 to get under way. Then, they need the marketing, training and technical support of a well-capitalized major corporation that understands all the aspects of this business, Poppa said.

Air Force Gets 'Breadboard' Bubble System

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — A magnetic bubble memory that stores two million bits of information in garnet chips has been delivered to the Air Force Avionics Laboratory (Afal) here.

The memory and associated electronics were developed by Texas Instruments, Inc.'s Central Research Laboratory, Dallas, under contract to Afal's Electronic Technology Division. The total bubble system is designated a "breadboard" model for laboratory testing only.

The laboratory is the focal point for development of magnetic bubble memories for the Air Force, and the breadboard bubble system is part of a total program that is the largest Air Force effort to date on bubble memories.

According to Afal program manager Stewart Cummins, the Air Force is funding research and development of bubble memories because of their advantages over conventional memory devices.

"The bubble memories would be smaller, more reliable and store more information per volume than currently used data storage systems," Cummins said. "The 'bubbles' also could replace magnetic drums and disks in ground-based computers for both military and commercial applications.

"Delivery of the breadboard bubble system to Afal is a milestone in this new technology. The device is operating well, and evaluations to date show that the 'bubbles' provide much lower error rates than mechanical data storage machines," he said.

The basic storage device for the breadboard system is a major/minor loop magnetic bubble chip using 5-micrometer diameter bubbles. The nominal storage capacity of each chip is 135,000 bits. Sixteen chips are contained in the system, and half of those are accessed in the operating system.

The magnetic module used contains two chips in a dual in-line type package that operates with 250 kHz, triangular waveshape coil-drive. The bubble memory packages are mounted on two memory cards called bubble data modules (BDMs).

The breadboard electronics includes a read-only memory (ROM), which allows the use of the chips with some inoperative minor loops. This technique improves chip yields and reduces the cost of magnetic bubble devices.

The overall breadboard bubble system is controlled by a 16-bit microprocessor that can be programmed for various applications and functions such as self-checking.

During the second phase of the Afal program, Ti will develop and build three fully populated, 16M-bit brassboard bubble memory systems. They are intended primarily to be airborne computer mass memory systems, but similar systems would be suitable for satellites, ships and submarines, the Air Force said.

The brassboard bubble systems will be delivered here in one year.

Foreign Orders & Installations

Nordic Bank, Ltd. of London has purchased a minicomputer-based banking and communications system from Arbat (UK) Ltd. The system is based on twin 64K-word DEC PDP-11/60 minicomputers and triple RK06 disk subsystems.

General Distributors of Canada Ltd., has installed two Univac 90/30s. One system is located at the administrative headquarters of Metropolitan Stores of Canada Ltd. in Pointe Claire, Quebec; the other is located at General Distributor's offices in Winnipeg, Manitoba, where it will be used for payroll and accounting.

Rotaprint Ltd., a printing equipment and supplies company in the UK, has installed a Honeywell Information Systems, Inc. Model 66/05 system.

Trident Television Group, which operates the Yorkshire and Tyne-Tees independent television stations in the UK, has installed a Honeywell Information Systems, Inc. Level 66 system valued at $950,000 at its offices in Leeds, W. Yorkshire, UK. The system will handle advertising bookings for the two channels.

Barclays Bank International Ltd. of London has ordered a Nonstop 16 system from Tandem Computers, INc. for the bank's foreign exchange dealing room.

Dumb Connection.™

almost as long as you want to give it input. At 180 cps.

The Dumb Connection. Another reasonable, cost-effective product from Lear Siegler. For those who always wanted a Dumb Terminal, but needed hardcopy, too.

Now you can have the best of both worlds. And the connection to go with them. In one package.

Dumb Connection.™
Smart Buy.

LEAR SIEGLER, INC.
ELECTRONIC INSTRUMENTATION DIVISION
DATA PRODUCTS

Model
210

Lear Siegler, Inc./E.I.D., Data Products,
714 N. Brookhurst St., Anaheim, CA 92803; (800) 854-3805. In California (714) 774-1010.

Will Start Slowing After '82

IRD Predicts Fast Growth in Multiplexer Area

NEW CANAAN, Conn. — Markets for data multiplexers are expected to grow rapidly in the 1978-82 period and more slowly thereafter, according to a report from International Resource Development (IRD), Inc. here.

The multiplexer market could grow to more than $500 million worldwide by 1988, the firm said, based on its survey of multiplexer users.

Most of the users of data multiplexers (beside the common carriers and time-sharing companies) fall into the "Fortune 1,000" group of major manufacturing and service firms, IRD said. These users are rapidly growing more sophisticated in their use of data communications equipment and services, and many of them are adding senior data communications professionals to their staffs, according to IRD.

In the survey, data communications users were asked whether they expected significant changes in their network configurations following the advent of the Satellite Business Systems (SBS) network (which is currently expected to be operational in 1981 or 1982).

While a majority of the respondees expected to be users of the SBS services and expected significant network changes to result, they were not inclined to wait until the early 1980s before purchasing multiplexers and other data communications gear.

Many of the respondees envisioned that the greatest benefits of satellite communications, as far as their companies were concerned, would flow from the availability of SBS-type wideband services for International communications.

Most of those users planning multiplexer purchases were most interested in intelligent time-division multiplexers (ITDMs), which they saw as providing the most flexible and cost-effective multiplexing functions. In fact, the IRD study pointed out that the expressed intentions to purchase ITDMs within the next two years were so strong that there is some question as to whether suppliers will be able to meet the demand for this type of equipment.

Some of the ITDM suppliers are believed to be having teething troubles with their new products, according to IRD, and many of the users need considerable vendor support in the installation and servicing of their ITDM products.

Users were asked about their potential use of packet-switching networks, such as those operated by Telenet and Tymnet, in place of dedicated multiplexed networks. Several users indicated they planned to make some use of packet switching, but most expected to retain their own networks and did not see a significant negative impact on their use of multiplexers.

Further details on the report are available from IRD at 125 Elm St., P.O. Box 1131, New Canaan, Conn., 06840.

How to avoid having the source of your data become the source of your problems.

A Special Report on Source Data Entry in our April 24th issue.

The trend in data collection is to get closer and closer to the data's source — with devices like OCR and Point-of-Sale systems. Which can be the source of lots of new problems for the user. What may be good for counting hamburger sales in a fast-food franchise, may be quite unsuited to a grocery store or egg wholesale business. And a system that's perfect for a big bank with many branches, may be useless at a medium-sized savings and loan.

In our April 24th supplement, edited by Frank Vaughan, we'll take a look at what it takes to get the data collection job done, accurately and efficiently, in a variety of different situations. Through a series of applications stories, we'll look at how others have solved their unique data collection problems, and give you an idea of some of the things you should do — as well as some of the things you shouldn't. The report will include:

- KEY-TO-DISK
- KEY-TO-TAPE
- KEYPUNCH
- OCR
- POINT-OF-SALE SYSTEMS
- AND A SPECIAL LOOK AT DISTRIBUTED DATA ENTRY SYSTEMS

If data entry is one of the things you have to cope with, then *Source Data Entry — Getting the Job Done* is data you should enter. It'll be in our April 24th issue.

If you'd like to advertise, the closing date is April 7th, and more information is available from your *Computerworld* sales representative. Or call Terry Williams at (617) 965-5800.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston	**New York**	**San Francisco**	**Los Angeles**
Bob Ziegel Mike Burman Frank Collins (617) 965-5800	Don Fagan Frank Gallo (201) 461-2575	Bill Healey Jim Richardson (415) 421-7330	Judy Milford Bill Healey Jim Richardson (213) 475-8486

Contracts

The Pertec Division of Pertec Corp. has signed $1 million agreement with Computer Labs, Inc. of Greensboro, N.C. for the firm's T9000 tape drives and D3000 disk drives.

Datagraphix, Inc. has received a rental contract for 15 computer output microfilm systems from the U.S. General Services Administration.

Metridata Computing, Inc. has been awarded a five-year facilities management contract for DP services by First Security National Bank and Trust Co. of Lexington, Ky.

Cable & Wireless Ltd. of London has been awarded a contract to manage a message-switching system for Citibank N.A., New York. The system is to be located in Manama, Bahrain.

Memorex Corp. has been selected for a contract award by the Air Force Computer Acquisition Office at Hans com Air Force Base, Mass. The company will provide disk storage equipment to be connected to an IBM 360/-85 used by the Strategic Air Command (SAC). The contract is valued at $315,000.

CD Systems, Inc. has received contracts from Goodrich Dairy and Scott Footsavers for turnkey systems to assist in performing inventory control, accounts receivable, general ledger and payroll functions.

The Pertec Division of the Pertec Computer Corp. has been awarded a $3,500,000 contract frome Pfizer Medical Systems, Inc. for tape transports, tape drives, cartridge disk drives and flexible disk drives for use in th Pfizer 0200FS and 0400 body scanners.

Tymshare, Inc. has received a two-year contract from Western Electric Co. to provide general time-sharing and specialized services to the Bell System.

Business Systems Products (BSP), Inc. has been awarded a contract to provide its Adviser business system to the city of South Gate, Calif.

You won't believe our Ballistic™ Printer until you see one in print.

And in person.

Unless you've been in hiding, you've probably heard about LSI's family of Ballistic Printers. Built with the same proven dependability of the Dumb Terminal and his Smarter Brothers.

Our latest matrix printer, the 200A, comes with standard features like a Space and Blank Character Compression Buffer. Tabbing over Blank Spaces ability. Half Duplex or Full Duplex Operation. And a fully buffered input, optionally expandable to 1024 characters. Not to mention its microprocessor versatility, and firmware flexibility.

To top it off, you can choose from options like Serial, RS232, Parallel, and Current Loop interfaces. Polling. X-ON, X-OFF. And elongate character capability with a choice of either 10, 12 or 16.5 Pitch.

The Printer's reliability lies in the simplicity of its patented Ballistic head. Which ballistically propels the matrix wires to assure longer head life. Eliminating tube clogging with inks, dust, and paper fibers. Even wire tip wear is substantially reduced.

The Ballistic Printer uses a five-start lead screw and servo to print bi-directionally at 180 cps. Direct, simple, positive. And very accurate.

But, seeing is believing. So, if you'd like to be amazed by our Ballistic Printer in person, write or call us toll free (800) 854-3805. Just ask for Tom Hudspeth.

If you haven't seen the Ballistic Printer in action, you haven't seen ballistic printing.

allistic™ Printer.
ougher in the long run.

LSI
LEAR SIEGLER, INC.
ELECTRONIC INSTRUMENTATION DIVISION
DATA PRODUCTS

Lear Siegler, Inc./E.I.D., Data Products, 714 Brookhurst St., Anaheim, CA 92803; (800) 854-3805. In California (714) 774-1010.

POSITION ANNOUNCEMENTS

SUNBELT-FEE PD SOFTWARE SPECIALISTS

To $25,000. Our client, a multi-million dollar industry leader due to co growth currently has openings for several resident software professionals. Req 3+ yrs DEC/RSX-11M or other Real Time operating systems exp. S.E. location, full career benefits. For details contact J.K. Schwab at (704) 375-0600 or send resume including salary history in confidence to:

FOX-MORRIS
PERSONNEL CONSULTANTS
1742 Southern National Center
Charlotte, NC 28202
EDP PLACEMENT SPECIALISTS.

HOSPITAL DATA PROCESSING MANAGER

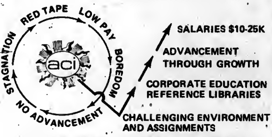
Major research and educational hospital in Denver, Colorado, is seeking a data processing manager with experience in financial systems implementation. IBM 370, data base management experience desirable. Salary in the upper $20's. Submit resume and salary history in confidence to:

Mr. J. Garth Boyd
Suite 400, United Bank Ctr.
1700 Broadway
Denver, CO 80290

PROGRAMMERS ANALYSTS TECHNICAL WRITERS

IS THIS YOUR CAREER PATH?

aci CALL COLLECT 513-278-4861


RED TAPE
LOW PAY
BOREDOM
NO ADVANCEMENT
STAGNATION
aci
SALARIES $10-25K
ADVANCEMENT THROUGH GROWTH
CORPORATE EDUCATION REFERENCE LIBRARIES
CHALLENGING ENVIRONMENT AND ASSIGNMENTS

ACI is doing current software and application development including IBM/OS, IMS, CICS, DATA BASE, Teleprocessing, Microprocessor Systems, Distributive Processing and many others. Give us a call collect and find out what we're all about.

(513) 278-4861
EOE/MF

aci **automation consultants, inc.**
1700 needmore road, dayton, ohio 45414

Serving:

Chicago
Cincinnati
Cleveland
Columbus
Detroit
Oklahoma
Pittsburgh
Toledo
Texas

As Well As Dayton

Systems Analyst

San Francisco Bay Area

An immediate opening exists at our Corporate Headquarters for an Analyst/Programmer, experienced in the design and implementation of manufacturing/related computer systems. Hardware consists of Honeywell 2040 and multi-processor Datapoint ARC systems, supported by a network of Datapoint 1134 and 4530 systems at 12 manufacturing sites. We prefer college degree and 1-5 years' experience designing and programming applications in COBOL or DATABUS.

This position offers competitive salary, benefits and career growth. Send resume, including current compensation, to: Personnel Manager, Hexcel Corporation, 11711 Dublin Blvd., Dublin, CA 94566. An equal opportunity employer, m/f.

HEXCEL

DATA PROCESSING MANAGER

Our fast growing Indianapolis-based manufacturing firm is searching for an effective data processing manager with the following qualifications:

- Undergraduate degree, IE or IM a plus
- Disciplined systems management experience including programming, systems analysis, and project leadership
- Experience with order entry and manufacturing systems including knowledge of MRP

Please send your resume in confidence to:

CW Box 1524
797 Washington St.
Newton, MA 02160
An Equal Opportunity Employer

SOFTWARE SYSTEMS ENGINEERS

General Electric... for 100 years, a company giving people a better opportunity.

General Electric Drive Systems Department is in Salem, Virginia —nestled in the Roanoke Valley.

We're a world leading producer of sophisticated large-scale controls for industrial drives. And as programmable automation plays a larger role in our products, software engineers are playing a broader more critical role in our business.

Join us and you'll be involved in developing software systems for on-line real-time applications in an industrial process control environment utilizing application-oriented software. Responsibilities will span system conception, systems design and diagnostic tests, system architecture, and hardware/software trade-off.

Requirements: a BS/MS in EE or Computer Science and at least 4 years of applicable experience.

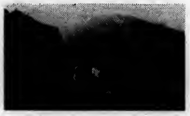
All openings offer fully commensurate salaries, comprehensive GE benefits including relocation assistance.

* * *

Find out for yourself how GE in the Roanoke Valley will make a big difference in the quality of your life.

THE *Roanoke Valley...*

for 200 years, a region offering people a better quality of life.



Few areas of the country can rival the scenic beauty and comfortable lifestyle of the Roanoke Valley.

Summer, Fall, and Spring last longer here. There's more time to explore the riches of Southwestern Virginia's Blue Ridge Mountains . . . and outdoor attractions like the Jefferson National Forest, the Appalachian Trail, and hundreds of acres of public parks.

Two civic centers present everything from opera and theater to sports and exhibits. Playhouses and art centers augment the cultural scene.

Nearby educational centers include a graduate extension of the U. of Virginia and Virginia Polytechnic Institute.

To apply, send resume, including salary history, to Mr. Thor Trolsen, General Electric Company, 1501 Roanoke Blvd., Salem, Virginia 24135.

GENERAL ELECTRIC

GE takes pride in being an equal opportunity employer.

PROGRAMMER/ ANALYST

Manufacturing
Lakes Region
New Hampshire

Excellent career opportunity for experienced programmer/analyst. Work with small professional staff in implementing new approach to corporatewide information systems. Two-three years experience in COBOL, DOS-VS, manufacturing or financial systems required.

Please send resume and salary history to: CW box 1523, 797 Washington St., Newton, MA. 02160.

Overseas Adventure To $40K USA

IRAN

SYSTEMS ENGINEERS/ SOFTWARE PROGRAMMERS
UNIVAC 1108 & EXEC VIII
DMS 1100 Data Base Exp

Rare opportunity for 1108 Senior programmer or Systems programmer to live & work in Iran, land of growth & adventure. 18-24 mon. assignment with many outstanding benefits. Send resume to Mr. Tink Nathan, President.

CYBERMETRICS CORP.
P.O. Box 579
McLean, VA 22101
(703) 356-1997
Other positions avail.
USA & Iran

FIELD ENGINEERS

IBM 360/70 SYSTEM/3 MINI SYSTEMS

SORBUS INC., a leader in EDP equipment maintanance, has immediate openings nationwide for highly skilled Field Engineering professionals.

Our expanding service network offers an opportunity to specialize or diversify. Background should include 3-5 years experience in maintenance and repair of IBM 360/70 - System/3 or comparable Mini Systems and peripherals.

These positions provide excellent opportunities for personal recognition and professional growth through advanced training and career development programs, along with attractive compensation, incentives, and benefits.

If you are interested in working for a progressive company, and want a bright future, please write or call toll free:

Les Broadway
Personnel Administrator
SORBUS INC
150 Allendale Road
King of Prussia, PA 19406
(800)-523-5632

SORBUS INC.®
anMAIcompany

An Affirmative Action Employer

DIGITAL SALES REPS DON'T JUST SELL A GOOD DEAL. THEY GET ONE.

We've always been known for giving our customers the best deal in the computer industry.

And what goes for our customers, goes for our people. Take Sales Representatives.

The first part of the good deal for you is what you get to sell. Great product. At a great price. With great delivery. Year after year.

If you have the kind of experience we're looking for, you already know how important that is.

And that's just the beginning.

Instead of chasing a changing commission plan, you're leading a team.

The next thing we give you is a good professional salary.

Because we see you as an important corporate resource.

On salary, your whole world changes. You're backed by a full support team. Software specialists and applications experts, right there with you when you need them. Home office marketing groups, ready to travel. Other sales people who work with you as partners instead of competitors.

You can even take time out from the field for courses in personal and professional development. And your future earnings are as secure as your dedication to the job.

We'll offer you an opening almost anywhere you want.

Right now we have openings for good Sales Representatives all over the country. No matter what your market specialty, we can use you. So if you absolutely love New York, or simply can't leave Atlanta, we can probably accommodate your needs. With ease.

At Digital, there's room at the top.

Within our sales organization, we give you two ways to move up—into management, or into senior levels of selling. But we also offer you the opportunity to move into anything else you like. You can get into marketing. Product development. Manufacturing. Whatever. Starting from sales, just like many of our top management.

And there's more.

A substantial benefits package that's among the best in the industry.

The resources of a billion dollar company with the vitality of a bright young business.

Corporate growth of over 30% each of the last five years.

New products coming out at the rate of one every two weeks. And even more.

Call us today.

For a complete brochure package on opportunities for the Sales Representative at Digital, simply call (in complete confidence) one of these numbers:

Northeast, **800-225-8335** (in Mass., 617-890-0330); Mid-Atlantic, **800-526-3877** (in N.J., 201-496-9211); Southeast, **800-438-1374** (in N.C., 704-525-7150); Midwest, **800-323-6692** (in Ill., 312-640-5500); Southwest, **800-231-8008** (in Tex., 713-977-7575); West Coast, **800-421-1887** (in Cal., 213-640-1830).

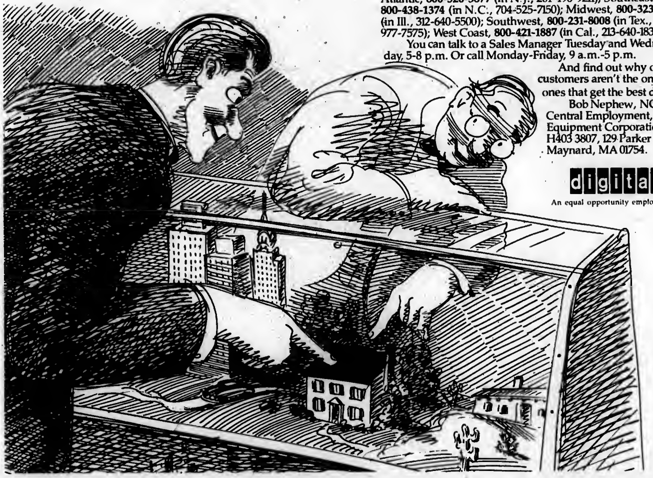
You can talk to a Sales Manager Tuesday and Wednesday, 5-8 p.m. Or call Monday-Friday, 9 a.m.-5 p.m.

And find out why our customers aren't the only ones that get the best deal.

Bob Nephew, NORAM
Central Employment, Digital
Equipment Corporation, Dept.
H403 3807, 129 Parker St.,
Maynard, MA 01754.

digital

An equal opportunity employer M/F



Software Professionals:

This may persuade you to join ADR...

The Company

ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed $20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

The Products

ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

The Environment

ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

Openings for Systems Software Development

If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software. Experience with online systems (CICS, TSO, etc.) or knowledge of OS internals is a definite plus. If you have participated in the development of any type of software packages — system, utility, or application — we would really like to talk to you.

Openings for Systems Software Support

ADR knows that its products can only be as good as the service we give our customers. If you like dealing with people, enjoy an occasional trip, and have strong communication skills, you might consider a support position at ADR. To qualify, you should have a strong technical background in IBM computers and operating systems, and a college degree. As our product line continues to expand, our product support needs will grow as well. You could be a part of that growth!

This may persuade your family...

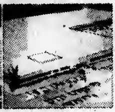
Princeton:
A Top Ten Town
Princeton is on almost everyone's list of the ten best American communities in which to live. Yet it is suprisingly affordable. It offers not only beauty and serenity but a wide variety of cultural, sporting, and educational activities.

Sports Unlimited
It's been said that Princeton has almost as many tennis courts as people. You can also sail, ice boat, and skate on Lake Carnegie. Or jog to work. Or golf at one of the many courses in the area.

One hour to N.Y. or Philadelphia
You're less than an hour from the shore — a stone's throw from historic Washington's Crossing and New Hope — within easy reach of the New Jersey Turnpike and the Garden State Parkway.

Educational and Cultural Facilities
The home of Princeton University. The Institute for Advanced Studies. Westminster Choir College. and many superior grade and high schools. The McCarter Theatre is in town and the Bucks County Playhouse nearby.

Excellent Housing
You can live next to the old Raritan Canal, on a golf course, or in an old grist mill. Princeton and other beautiful communities nearby can fill your needs for an apartment or home at every price level.



ADR's new home
In the summer of 1979 ADR will be moving to a new 65,000 sq. ft. building on 40 wooded acres in the foothills of the Sourland Mountains. This new site is less than a mile from ADR's current location.

Please send your resume in complete confidence, including current salary and position desired, to:
Director, Software Products Division. Or call 609-921-8550.

APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS™
Route 206 Center, Princeton, N.J. 08540

An Equal Opportunity Employer

FLORIDA

Growing Company has openings for Programmer Analysts with strong DOS Assembler experience. Minimum two years with CFO, CFO II, or Life Comm. Need one with systems software and CICS experience. Excellent opportunity. Relocation expenses paid, employee portion of Fringe Benefits paid. Send work and salary history to Founders Life Assurance Company, P.O. Box 1571, Tampa, Florida 33601. Attn: F.C. Enoch.

SENIOR PROGRAMMER ANALYST

Leading NYC consulting firm. Salary to $30,000. Knowledge of IMS & MFS.

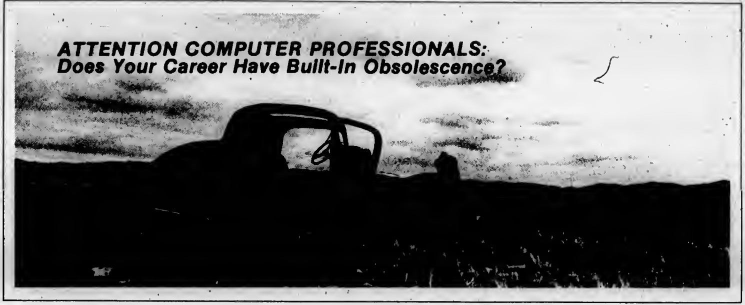
Call for appointment
George Lang
(212) 687-0333

MANAGER OF COMPUTER OPERATIONS

Aggressive Miami based company is expanding its data processing facilities to include a substantial DEC PDP-11/70 real-time, on-line system. A minimum of 5 years systems design and implementation experience is required with management responsibilities in those areas preferred. A thorough knowledge of DIBOL-11 and Basic or Basic Plus under RSTS/3 most desirable.

Salary will be commensurate with experience and qualifications, with excellent benefits as part of this management position.

Please submit resume; in strictest confidence to CW Box 1513, 797 Washington St., Newton, Mass. 02160.


ATTENTION COMPUTER PROFESSIONALS:
Does Your Career Have Built-In Obsolescence?

National CSS is your answer with state-of-the-art

- **computer systems technology**
- **multi-market applications**
- **unlimited capabilities**

You'll find it all with National CSS, one of the few companies in the world capable of exploiting the full potential of today's most sophisticated computer hardware and software systems...from the IBM 370 and Amdahl Series...to minicomputers... from VP/CSS...to a wide range of advanced application products.

Since our founding eleven years ago, National CSS has proved its leadership in the expanding marketplace of information services. We have achieved prominence through our ability to recognize trends and react swiftly, and by developing extensive knowledge and experience in the numerous disciplines essential to high performance data processing and communications. Our accomplishments are reflected in the fact that our sales have quadrupled in the past four years.

And now, as a natural outgrowth of our information services knowledge and experience, we are introducing our own line of mega-minicomputers. More than ever, National CSS is ready and able to service the total data processing markets...present and future.

This expansion of our data processing capabilities has created outstanding career opportunities for computer professionals in all disciplines.

If you are seeking an excellent salary and benefits package, coupled with high visibility and advancement opportunities with a firmly established and stable company...you belong at National CSS.

For immediate consideration for positions in all 27 offices, send your resume in confidence to: Nancy Potenza, Employment Manager, National CSS, Inc., Dept. C 43, 542 Westport Avenue, Norwalk, Connecticut 06851

NCSS offers a wide range of career opportunities in the following areas:

- **Programmer/Analysts**
- **Sr. Programmers**
- **Systems Analysts**
- **Systems Consultants**
- **Systems Programmers**

- **Sales Managers**
- **Sales Reps**
- **Sales Support Reps**
- **Product Marketing Professionals**
- **Technical Writers**
- **Training Specialists**

Immediate career opportunities exist throughout the United States in the following locations: Atlanta, Cambridge, Chicago, Cleveland, Dallas, Denver, Detroit, Elizabeth (NJ), Hartford, Houston, Los Angeles, Minneapolis, Newport Beach (CA), New York City, Philadelphia, Phoenix, Pittsburgh, Portland (OR), St. Louis, San Diego, San Francisco, Santa Clara (CA), Stamford, & Washington, D.C.

An Equal Opportunity Employer M/F

National CSS

meet the challenge of our evolution

"IN THE ORDINARY COMPUTER COMPANY, IDEA WOULD NEVER HAVE MADE IT TO MARKET...BUT DATA GENERAL IS NOT YOUR ORDINARY COMPUTER COMPANY."

Jit Saxena, Department Manager, Data Base,
Data Communications Software

"That's the way it is in our software group. We reward initiative and creativity. Our Interactive Data Entry and Access system was a product initiated by development groups at Data General. There's no conventional product like it anywhere else in the industry...other computer companies are too conventional. But here, there is a real acceptance of fresh approaches.

"Moreover, you have the opportunity to work on everything from definition to final testing. We put fewer bodies on a project than other companies. Result? More efficiency for us and more visibility, identity, more chance for success for you. Which is a big reason Data General is the third largest computer manufacturer in the world and the fastest growing minicomputer company of them all."

Jit Saxena was one of our early Systems Engineers in the field. Today he heads the department responsible for all software related to Distributed Processing Systems. And right now Data General has some interesting challenges for software pros.

SOFTWARE DEVELOPMENT

Data Base Management Systems This group designs systems concerned with end user facilities, language extensions, concurrency and recovery control, data storage and access methods, distributed data base processing definition and extensions.

Performance Evaluation This group is responsible for developing and implementing the following: a software monitor to record operating systems activities, a minicomputer based remote terminal emulator, and a hardware monitor.

Operating Systems This group is responsible for sophisticated, multi-programmable advanced operating systems. Requires thorough knowledge of O/S internals in order to participate in the design, development and maintenance of the system.

Development Methods This group is involved with structured design and programming, high level systems implementation languages and their compilers, language-oriented editors and debuggers and documentation tools. We are dedicated to developing software a better way.

Software Reliability This group develops, documents and implements system software and procedures to assure functionality and reliability of Data General Software. This group gives you the broadest possible exposure to Data General's software and hardware products.

Communications This group designs, develops and maintains communications software products for use throughout the DG product line. Includes implementation of communications protocol support (BSC, SDLC) for operating systems, batch terminal emulators (2780, 3780, HASP work station), interactive terminal products and special purpose communications applications.

Compiler Development This group is responsible for development of commercial and scientific languages. Projects currently under way are COBOL, ALGOL, PL/1, FORTRAN and other high-level compilers. Responsibilities will include all levels of development of syntax processors, code generators, run time support routines and system utilities.

If you wish to explore these or other software positions in further detail, call Jim Stewart at (800) 225-7347, ext. 3065; in Massachusetts, call collect (617) 366-8911, ext. 3065. Or send your resume, complete with salary history, in confidence to Jim at Data General Corp., 15 Turnpike Rd., Westboro, MA 01581.

Data General

An equal opportunity employer M/F

SYSTEMS ANALYST/ PROGRAMMER

Honeywell's Solid State Electronics Center in Colorado Springs has an immediate opening for an experienced manufacturing Systems Analyst/Programmer. This growing facility's charter includes volume processing of integrated circuits and semiconductor devices. This position carries a major responsibility in maintaining an information systems operation to meet the operational and financial requirements.

Necessary qualifications:

- Desire 2-5 years' manufacturing systems analyst experience with an integrated manufacturing information system.
- Cobol programming experience required.
- Manufacturing systems background required.
- Experience in writing specifications, preparing systems designs, and programming and testing systems also necessary.
- College degree in related discipline preferred.

Candidates should submit resume and salary history in complete confidence to Aggie Van Houten, or CALL COLLECT:

Honeywell

Solid State Electronics Center
1150 E. Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906
(303) 576-3300

An Equal Opportunity Employer M/F

Honeywell

PDP 11 SOFTWARE AND HARDWARE JOCKS

Fast-growing DEC DEM with systems installed nationwide needs 2 key persons:

- A bit fiddler who knows CTS500 and CTS300 inside and out.
- A Mr./Ms. Hardware Wizard experienced at maintaining: 11/34, RK06, RK05, LA180, VT52, PDP 8/A, Floppies, Diablo printer, Dataproducts printer. Software knowledge also desirable.

We offer a competitive salary, stimulating environment and free coffee! Please send resume in confidence to:

Tim Ruben
Vice President,
Research and Development

Systems By Graber, Inc.
901 S. Whitney Way
Madison, WI 53711

INSURANCE DATA PROCESSING PROFESSIONALS

We offer a ground floor opportunity to grow with a rapidly expanding life insurance company

HERE ARE THE CHALLENGES:

- SOPHISTICATED APPLICATIONS
  - LIFE-COMM III on-line real-time life processing
  - ISA/ABC Accounting Budget and Cost
  - Financial Modeling and Forecasting
  - Credit Life Processing Systems
- GROWTH
  - DOS to OS Conversion
  - On-line Programming
  - CICS
  - Educational Programs
- OPPORTUNITIES
  - Programmer Analysts
  - System Analysts
  - System Programmers
  - Group Leaders

We offer a pleasant suburban location a people-oriented atmosphere training and educational programs excellent salary benefits and relocation assistance

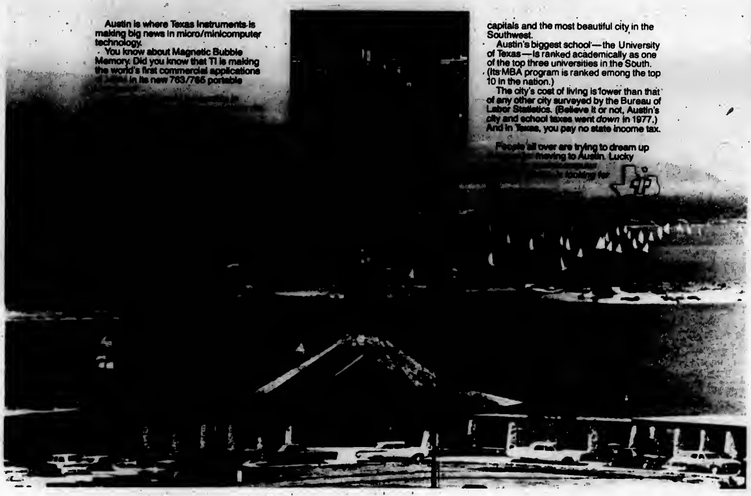
Please send your resume or qualifications and salary requirements in confidence to

WILLIAM S. WILKINS • Vice President of Data Processing
33045 Hamilton Boulevard • Farmington Hills, MI 48018

Alexander Hamilton Life Insurance Company of America

Equal Opportunity/Affirmative Action Employer M/F

Minicomputer Specialists: TI's got a home for you where everybody wants to live: Austin, Texas



Austin is where Texas Instruments is making big news in micro/minicomputer technology.

You know about Magnetic Bubble Memory. Did you know that TI is making the world's first commercial applications [illegible] in its new 763/765 portable [illegible]

capitals and the most beautiful city in the Southwest.

Austin's biggest school—the University of Texas—is ranked academically as one of the top three universities in the South. (Its MBA program is ranked emong the top 10 in the nation.)

The city's cost of living is lower than that of any other city surveyed by the Bureau of Labor Statistics. (Believe it or not, Austin's city and school taxes went *down* in 1977.) And in Texas, you pay no state income tax.

People all over are trying to dream up [illegible] moving to Austin. Lucky [illegible] looking for [illegible]

Immediate Openings:

Design Engineers
Experience in memory or microprocessor systems design with 1-5 years' experience and a BSEE or equivalent. Opportunities in peripheral interfaces, disc controllers, bubble memory controllers, edvanced systems controllers, and multimicroprocessor computers.

Production Test Engineer
Design, development and support of sophisticated test equipment and requirements for new minicomputer and terminal products. BSEE with 1-10 years' experience in computer logic design, checkout or test software experience desirable.

Product Service Engineer
Support new computer products from conception to field maturity with a BSEE and 2 or more years' in design or sustaining of minicomputers/peripherals.

Reliability Engineer
Perform detail stress anelysis, reliability predictions, and life testing of new minicomputer products with 1-4 years' experience and BSEE.

Product Marketing Engineer
Support field engineering, anelyze customer systems applications, competitive market analysis, and market planning/execution with an MBA and undergraduate technical degree with 1-5 years' computer experience.

Marketing Analyst
Responsibilities through marketing for softwere products including research, competitive enalysis, and coordination with software development. Must have a CS degree.

Product Marketing Planning Manager
Responsible for long-renge planning of computer and systems products, market segment definition, market share studies for minicomputers. 5-7 years' experience in computer merketing.

Audit Analyst
Individual selected for these positions will conduct in-depth technical analysis of new softwere products and product development for quality and usability.

Software Support Programmer
Duties will require maintenance of existing software packages and essist in our nationwide field operation.

Systems Development Programmer
Opportunities on a new project of multi-microprocessor products using the latest memory erchitecture. Opportunities also include design of new operating systems for follow-on products.

Applications Programmer
Project member for commercial, industrial or business systems departments having direct contact with customers doing software product development.

Diagnostics Programmer
Design/development of intensive unit/systems level diegnostic software for 990 computers in a standalone end reel-time environment.

Business Programmer
Design new systems with COBOL to setisfy the needs of a small business computer user.

Applicants for these programming positions must possess a background in one or more of the following areas: microprocessors, operating systems, distributive processing networks, assembly and higher level languages. Requirements also include ability to communicate effectively, desire to work with customers, end e BS in CS, EE or Math.

Technical Writers
Urgent need for senior and entrylevel to prepare hardware/softwere documentation for stete-of-the-ert minicomputer products. Degree in EE, CS or releted field with 1-5 years' writing experience. Non-degreed candidates also considered if a strong digital background is possessed.

Technical Instructors
Good communicator desiring to teach customers/field personnel in letest hardwere/software products. Technical background with master's and teaching experience desired.

Project Leader
Responsibilities include supervision of engineers/techniciens on projects related to bubble memory, edvanced displays. Requires 4-7 years' minicomputer leadership experience.

Send your resume in complete confidence to: Staffing Menager/P.O. Box 2909, M.S. 2106/Austin, TX 78769.

TEXAS INSTRUMENTS
INCORPORATED
An equal opportunity employer M/F

Are you good enough at what you do to teach it?

"What – me teach? Forget it! That's what I thought when I was a co-op instructor here. I left Data General to look for the real world. I came back. Because the real world is right here. And there's no more exciting place to be than right up front with all the new product developments. That's right – TEACH! You can too, if you're good enough!

Ken Rodrigues
Supervisor,
Software Education

"Never a dull moment! You have to know your subject cold to teach it, when you're dealing with adults who have to know. I've always liked explaining things. As a Data General instructor I never have to worry about motivating the class. They're here because they're already motivated."

Maureen Hamilton
Sr. Educational
Specialist

Software Instructors

With 2 or more years' real time systems or applications programming experience (assembler and higher level languages) on mini-to- medium computers, you're on your way. Knowledge of operating systems and communications, previous teaching experience desirable. You will develop and conduct programming/software courses for customers. And there is the opportunity to keep your hand in applications programming.

Systems Training Specialists

You need 5 or more years in systems or applications programming in a real time disc operating system environment. Minicomputer experience is desirable. Teaching or presentation experience a plus. You will develop and conduct systems courses for our sales and applications personnel and work with customers on advanced systems/application programa.

You don't have to be an instructor to qualify. But you do have to be good at what you do.

Send us your resume, with this ad to Jon Zion at Data General Corporation, Route 9, Mail Stop 6-1, Southboro, MA 01772. Or call him collect at (617) 485-9174. Data General is an equal opportunity employer, M/F.

Openings exist at our headquarters in Westboro, as well as Boston, Atlanta, Chicago and Los Angeles.

I'm good enough to teach what I know.
Here's my resume.

Signature ________________

Data General

WANTED:

Manager of Systems and Programming

(Albany, N.Y. Area)

We have a really special career opportunity for an EDP Manager with more than 10 years of experience who is capable of taking total responsibility for developing an on-line integrated manufacturing, financial, and marketing system.

This position reports directly to the Director, Computer Services, of a multi-product manufacturing corporation, the sales of which are generated by mail order.

It would be helpful if you supervise at least 6 people in your present job, and you should feel at home communicating with top management.

The position will have complete responsibility and control for all systems and programming for a large DEC 11/70.

Our company is approaching the $60,000,000 mark in sales of gardening equipment by mail, and we feel we have only begun! Salary is negotiable. Fringe benefits are extraordinary.

Please reply in confidence and detail to

Director of Computar Sarvices,
P.O. Box 2302,
Norwalk, CT 06851

DATA PROCESSING POSITIONS

SAUDI ARABIA

A rapidly growing systems management company has immediate openings in Riyadh, Saudi Arabia.

PROJECT MANAGERS

Challenging positions involve development and operation of innovative TP systems for government agencies. Will manage international staff of DP and micrographics professionals with interaction at the highest levels of government. Must have at least 10 years solid DP experience and at least 5 years in significant management positions. Experience with large scale IBM TP systems required.

OPERATIONS MANAGERS

Challenging positions involve operation of large-scale IBM Teleprocessing system, multi-shift data conversion efforts, and micrographics production. Must have at least six years solid Data Processing experience and at least two years in significant management positions.

SYSTEMS PROGRAMMERS

Positions involve implementation and maintenance of an innovative IBM 370 TP system with CRT and Microfiche terminals. At least two years in-depth experience maintaining IBM OS TP systems required, preferably CICS with 3270 terminals. Must be able to maintain system single-handedly.

SENIOR SYSTEMS ANALYSTS

Minimum of five years experience in analysis and design of business TP applications. Must be knowledgeable in COBOL and IBM OS TP systems, preferably CICS and 3270 terminals. Should be capable of leading large projects.

PROGRAMMER ANALYSTS

Minimum five years experience in applications design and programming in a TP environment on IBM 370 OS systems. Must be fluent in COBOL and assembler and possess knowledge of IBM's CICS and 3270 terminals.

COMPUTER OPERATORS

Minimum two years experience as Senior Operator of IBM OS teleprocessing system.

OPERATIONS INSTRUCTORS

Will be responsible for operations training of Arabian personnel. Must be completely familiar with IBM computer operations and possess instructor skills.

KEYPUNCH INSTRUCTORS

Will train Arabian personnel in keypunch and verification skills. Must have significant practical experience, possess instructor skills, and speak Arabic.

Salaries commensurate with experience. Excellent benefits. Six weeks paid vacation annually with round-trip air fares to place of residence. Free furnished housing and free education for children. Send resume and salary history to:

SYSOREX INTERNATIONAL, INC.

10590 North Tantau Avenue
Cupertino, CA 95014
Attn: J. Singlton

SENIOR PROGRAMMER ANALYST
APPLICATIONS PROGRAMMER

Rapid growth has created openings for programming professionals with the potential to move into management positions. These career opportunities are both challenging and rewarding. Our new headquarters facility is located in an easily accessible northwest Chicago suburb and our salary and benefit package is excellent.

SENIOR PROGRAMMER ANALYST

This position requires an individual who will participate in the full range of systems design and analysis activities while directing programming efforts in a project team environment. Demonstrated excellence in this position will assure rapid advancement to the position of manager of systems and programming. A degree in Computer Science or equivalent experience is required.

APPLICATIONS PROGRAMMER

Qualifications for this position are a demonstrated working knowledge of IBM BAL or COBOL plus a desire to advance. Experience with IBM JCL and CICS would be a plus.

Send resume and salary history or call for an interview appointment:

BOISE CASCADE CORP.
Office Products Division
Manager, Information Service
800 West Bryn Mawr
Itasca, Illinois 60143
(312) 773-5061

an equal opportunity employer M/F

PROGRAMMER/ANALYST POSITIONS

Eastern Michigan University has openings in the following areas:

Programmer/Analyst I

Successful completion of computer science course and a Bachelor's degree or the equivalent combination of education and experience. Salary range: $10,565 - $14,477.

Programmer/Analyst II

Successful completion of computer science courses and one to three years computer programming experience necessary. Bachelor's degree or the equivalent combination of education and experience. Salary: $12,209 - $16,778.

Languages used, PL-I and COBOL under 360-50DOS/VS.

Application may be obtained by contacting:

Eastern Michigan University
Personnel Office
112 CW Welch Hall
Ypsilanti, MI 48197
(313) 487-3430

AA/EOE and Educational Institution.

FACULTY POSITION

Available August, 1978, to teach OR/Management Science/Computer Science in degree program similar to ACM/AICPA recommendations. Emphasis on teaching. Masters required, doctorate preferred. Rank and salary dependent on qualifications. Applications must be received by April 15, 1978. Contact: Don B. Mitchell, Head, Computer and Management Science Department, Arkansas Tech University, Russellville, ARK 72801. An Equal Opportunity/Affirmative Action Employer.

WANT TO PLAY ON A WINNING TEAM?
THE TELEPROCESSING SCORE IS... INFORMATICS-3, IBM-2, OTHERS-1

"Rarely does a single software company offer a series of data communications monitors designed to support a wide range of computer hardware/software. INFORMATICS DOES THIS WITH A TRIO OF SYSTEMS CALLED INTERCOMM, BETACOMM, AND MINICOMM".– Datapro Research Corporation

We are proud of the fact that our Monitor IV line includes the first telecommunications monitor to ever attain the Datapro Software Honor Roll (Minicomm/1974), the largest user group of any independent telecommunications software company, and the finest customer service/marketing support staff available.

If you are interested in:

- **SALES**-and have a proven software sales record (T.P. experience a plus)
- **TECHNICAL SUPPORT** (pre-sales, on-site teaching, technical trouble shooting and marketing aid)-and have either 3 to 5 years OS systems programming (OS, MVS, OS/VS, DOS/VS) in telecommunications or T.P. monitors or software development in the T.P. field.

Send your resume to:

DON FRANCE
INFORMATICS/MONITOR IV

Equal Opportunity Employer M/F

Informatics inc
475 Park Avenue South
New York, New York 10016

DATA PROCESSING OPPORTUNITIES

About Datapoint:
Datapoint is the leader in "Dispersed Data Processing" with profitable sales in excess of $103 million. Datapoint has experienced a continuous annual growth of 45% for the past five years with the last quarter setting new records in all areas.

About Data Processing Openings:
Openings exist in the following areas to aid in the design, development and implementation of application programs for Customer Service in the areas of finance, inventory control, and automated dispatching.

Senior Systems Analyst:
Position requires a B.S. in Computer Science (or equivalent) plus six years programming experience, of which at least two years involved system design. You'll be called upon to participate in the discussion and analysis of complex systems requirements of users, the study of suggested projects for feasibility and alternate approaches, the development of detailed specifications for systems, preparation of cost analyses, manpower requirements and time schedules for systems development.

Systems Analyst:
Position requires a B.S. in Computer Science or equivalent with 4 years programming experience. Responsibilities will include analyzing systems requirements with users, development of detailed specifications for systems including cost analysis and preparation of status reports. Additionally, you will be responsible for the delegation of work to programmers.

Programmer II:
Position requires a minimum of 1 year of programming experience and a B.S. in Computer Science or equivalent. Your function will be to write new programs and modify existing programs. Duties will include coding, testing and implementing new programs, modifying existing programs and assisting in the analysis and design of programs. A Programmer II will also write user documentation for programs and prepare regular status reports.

About San Antonio:
San Antonio, the corporate headquarters, has excellent year round climate, no state or city income tax, low cost of living, excellent schools, hospitals, cultural activities and outstanding residential areas.

If you qualify for any of the above positions, please send your resume in confidence to Dan Haynes, Datapoint Corporation, 9725 Datapoint Drive, Mail Station M-83, San Antonio, Texas 78284.

DATAPOINT CORPORATION

The leader in dispersed data data processing™

We are an equal opportunity employer m/f

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

COMPUTER SYSTEMS ADVANCED PLANNING SPECIALIST

Will perform feasibility and systems design, procurement justification and evaluation of automatic data processing equipment. Also involves performance monitoring and analysis for improving present computer systems, a CDC CYBER 70/Model 76, and CYBER 170/Model 173 computer systems. BS or equivalent in Electrical Engineering, Computer Science or related field, with 8-10 years of applicable experience.

COMPUTER TRAINING COORDINATOR

Responsibilities will include the development of effective training programs for computer operations personnel, including computer operators and data entry personnel. Candidate should have a degree or equivalent in Computer Science/Mathematics and 3-5 years' experience in operating large scale IBM and CDC computer systems. Applicant should possess effective communication skills.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If intersted and qualified, please submit resume including salary history and requirements, in confidence, to.

TECHNICAL EMPLOYMENT-C
EG&G Idaho, Inc.
Box 1625, Idaho Falls, Idaho 83401
U.S. Citizenship Required
We are an equal opportunity employer M/F/H

EG&G

EDP SEARCH
SPECIALIZING IN RECRUITMENT AND PLACEMENT OF:
OS SYSTEMS PROGRAMMERS
Network Analysts
Performance Evaluation
EDP AUDITORS

SYSTEMS MGR $33M
Rocky Mtn Co. seek exper. in: Good Supervisory Skills, NCP/VTAM SDLC, MVS Internals, Networking.

Performance Eval. $22M
Must work with PE- tool have internals exper. Seek 2 yrs experience.

EDP AUDIT $15-$30M
We have over 80 positions open coast to coast.

Train for EDP AUDIT $18 to 25M
If you have strong financial systems design exper and good programming skills plus eng degree major CPA FIRM will train.

Scientific
We urgently seek all types mini exper for our clients coast to coast.

ATTN: Mr. S. Wali
EDP SEARCH
(405) 525-8833
Okla City, OK 73112
P.O. Box 12566

APPLICATIONS DEVELOPMENT CAREERS
CONNECTICUT

We have over 700 computer installations in the state of Connecticut. Many of our clients are in need of talented D.P. professionals today. The following is a partial list of positions we exclusively represent:

New Haven County
Programmer/Analysts

Fortune 500 consumer product corporation 370/255 TOTAL CICS COBOL. 3 years plus experience, bonus plus salary to $19,000.

Sr. Programmer/Analysts

Major service organization requires both BAL and COBOL experience. Work on on-line database IMS system. Three plus years experience. Salaries to $23.5.

Hartford County
Programmer/Analysts

Fortune 100 corporation 370/158 MVS IDMS on line, 4 years plus experience, diversified applications COBOL environment $21,000.

Project Leaders/Sr. Programmer Analysts

Major service corporation on-line CICS/VS development. TP and OM. Any language experience o.k., 4 years plus train PL/I. Salaries to $25,000.

Fairfield County
Sr. Programmer Analyst and Programmer/Analysts

Manufacturing corporation 370/138 converting to 148/OS. Financial and manufacturing applications. COBOL environment. Salaries to $21,000.

3780 Whitney Ave.
Hamden, Ct. 06518
(203) 288-7461

Our clients pay all fees and relocation expenses. For further information regarding these opportunities, please call or write Toby S. Erimberg.

BREEN DATA Division of the Breen Group, Inc.

SOFTWARE SYSTEMS PROGRAM MANAGEMENT

Our Products and Systems Management organization is seeking an experienced Systems Software Analyst to join our staff as a Product Requirements Analyst. This organization is responsible for the management of all hardware and software products released for sale by NCR.

The Product Requirements Analysts position concentrating on medium/large computer systems responsibilities will include:

- **Defining and segmenting systems software markets.**
- **Researching user systems software requirements by market segment.**
- **Analyzing competitive systems software products by market segment.**
- **Developing the design requirements to build the required systems software.**
- **Consults and monitors systems software development.**
- **Plans systems software product release.**
- **Recommends product price.**
- **Establishes training requirements.**
- **Recommends enhancements to existing systems software.**
- **Manages the products life cycle after its release.**

This position represents an exceptional opportunity for a Software Systems Analyst to take the first step into Product Management. To qualify for this position one should have an appropriate college degree and four or more years of Systems Software experience in a user environment. (Equivalent experience will be considered in lieu of a degree.) Systems Analysts employed in a Systems Software support group of a hardware or software vendor, or as a software support analyst with a medium or large computer user would be prime candidates for this position.

NCR offers competitive salaries, a comprehensive employee benefit program and an attractive geographical location from an environmental, cultural, educational and cost of living point of view.

If you would like to discuss further this position call:

Mr. Ed Lawrence

800-543-2386

In Ohio, dial (513) 449-4150 collect

or forward your resume, including salary history to:

U.S. Data Processing Group Placement
NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

NCR

Software Professionals

Caution:
Digital enthusiasm is contagious!

CHICAGO OPENINGS

We guarantee that once you've talked with us about our openings for:

SOFTWARE SUPPORT PROFESSIONALS

you'll come down with a good case of DIGITAL MOMENTUM. If you want to become part of our success story, talk to us and we'll tell you how Digital outperforms and outsells its competitors. Our people have more than just a name behind them...they have a support team that they can depend upon, and a superior product line to brag about. At DIGITAL, we know where we're going... and just how to get there.

Requirements:
(experience in one or more of the following)

*Real Time application software
*Business application software
*Operating systems development
*RSX 11, RSTS, RT 11, TOPS 10/20
*Assembly, Fortran and Cobol

In a customer environment you will be responsible for:

*Systems analysis
*Sales Support Presentations
*Software Consultation
*Software design and implementation
*Software Problem Resolution

Call (COLLECT) or write to: Ed Kaplan, (312) 640-5577, Digital Equipment Corporation, 5600 Apollo Drive, Rolling Meadows, Illinois 60008. We are an equal opportunity employer m/f.

digital

PHILADELPHIA

INSURANCE PROFESSIONALS

Join a team of outstanding professionals in the INSURANCE industry.

Our client, a PHILADELPHIA area INSURANCE firm, offers outstanding career growth spot w/an unusually high degree of visibility & mgmt recognition.

Sr. Programmer To $23K

2+ yrs IMS INTERNALS. Function "troubleshooting" capacity.

Sr Prog/Analyst To $22K

OS/JCL COBOL exp w/exposure to BAL. Oppty to move into PROJ LDR spot.

Prog/Analyst To $21K

2+ yrs REINSURANCE or INTERNAT'L INSURANCE apps. ANS COBOL, lge scale IBM bkgd prfd.

Prog/Analyst To $16K

OS/JCL Cobol bkgd. Exposure ICAMhighly prfd. P/C INS exp a +.

For immediate, confidential attention; please call or forward resume to:

ROBERT HALF
PERSONNEL AGENCIES, INC.

2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 568-4580

EDP MANAGER

John Blue Company, of Huntsville, Alabama, a leading manufacturer of farm equipment since 1886, is seeking an agressive/qualified individual to accept total responsibility for EDP management, operations, programming, systems development, hardware/software evaluation, coordination of project priorities, user liaison and total EDP expenditures/budgets. Experienced in several program languages, systems analysis, programming and supervision. Must be manufacturing oriented, preferably in metal fabrication/machine assembly environment. Appropriate degree required. Send resume and salary history in strict confidence to personnel manager, John Blue Company, 2800 Bob Wallace Avenue, Huntsville, Alabama 35807. An Equal Opportunity Employer M/F.

ROBOT SYSTEMS ENGINEERS

McDonnell Douglas Corporation, St. Louis, Missouri, has positions for individuals with an engineering or computer science degree, with experience in S/370 and PDP-11 programming systems in one or more of the following robot technology areas:

- **High Level Robot Programming Language**
- **Data Base**
- **Hierarchical Control Systems**
- **Vision Systems and Pattern Recognition**
- **Sensor Systems**
- **Post Processors**

Explore the possibility of joining our team of skilled professionals in advancing the state-of-the-art of robotics by sending your resume in confidence to:

W. B. KELLENBERGER
Section Manager, Professional Employment
Department CW-15 • P.O. Box 516
St. Louis, Missouri 63166

MCAUTO
A DIVISION OF McDONNELL DOUGLAS
An Equal Opportunity Employer

OMICRON

Consultants to the Computer Industry

COMPUTER PROFESSIONALS

Program your Future in the San Francisco Bay Area where the weather's always warmer...

OMICRON, a professional search and recruitment organization servicing major corporations, has excellent opportunities available now for Computer Professionals such as:

IMS/PROJECT LEADER/ANALYST to$29K

4 years IMS experience, systems design & installation.

SYSTEMS ENGINEERS $25-30K

Support marketing efforts of mainframe computer manufacturer. Requires operating systems internals in VS1, SVS, MVT or DOS/VS.

DIRECTOR OF SYSTEMS & PROGRAMMING to $50K

Strong management skills & extensive background in IBM State-of-the-Art & retail systems.

REAL TIME SYSTEMS DESIGNERS (Mini's) $18-29K

New design of teleprocessing systems software, networking, building hardware interfaces. Requires minicomputer operating systems background, knowledge of data communications & ALGOL, PL1 or PASCAL.

DATA CENTER MANAGER to $29K

IBM/MVS/IMS State-of-the-Art shop. Requires a strong operations management background in a large scale IBM environment.

For these and other outstanding career opportunities, please call or write, in confidence to:

OMICRON INC.

One Ecker Street
San Francisco, CA
94105
(415) 546-7200

525 University Avenue
Palo Alto, CA
94301
(415) 328-6150

Exclusively Employer Retained Agency

Our computers help make the perfect fit

JOB SEEKERS

JOB OPENINGS

CYBERSEARCH® is the **computerized** technical/professional employment service for recruiters and job seekers. Here's why it works much better than conventional matching of jobs with applicants.

Faster. Our computers can make a local or nationwide search for applicants in minutes.

More accurate. Better matching eliminates wasted interviews.

More complete. Information readily available from the data bank. Can't be misfiled or out-of-files.

Confidential. Individual and company names are coded.

EMPLOYERS, call nearest Cybersearch office for immediate service.

JOB SEEKERS, please send resumes.

Ask for the Data Processing Department.

CYBERSEARCH

The *COMPUTERIZED* Employment Service

CHICAGO, IL
214 North Michigan
60601
312-454-8490

IRVINE, CA
17744 Sky Park Boulevard
92714
714-754-7701

PHILADELPHIA, PA
Two Balacynwyd Plaza
19004
215 667 2400

DALLAS, TX
8585 Stemmons Freeway
75247
214-688 5810

LOS ANGELES, CA
8616 La Tijera Boulevard
90045
213 642-2462

SAN JOSE, CA
2025 Gateway Place
95110
408 866 3186

HOUSTON, TX
2000 West Loop South
77027
713 965-5666

MINNEAPOLIS, MN
6800 France Ave. South
55435
612 830 6650

CONTROL DATA CYBERSEARCH INC

GROW WITH...

THE EROS DATA CENTER

A rewarding and stimulating career opportunity offering the professional and personal recognition you seek is available now at the new Earth Resources Observation Systems (EROS) Data Center. This facility is the national center for the processing and dissemination of spacecraft acquired imagery and electronic data of the Earth's resources. The following positions are open immediately:

SYSTEMS PROGRAMMERS

Experience in systems software support of B-6700 computer preferred. Major efforts include support of:

- **B-6700 multi processor systems**
- **Data communications network**
- **large on-line data base**
- **mini computer image processing systems**
- **Array processing hardware**

SENIOR ANALYSTS

Qualifications should include Bachelor's Degree in Engineering or Scientific field and several years experience in DIGITAL IMAGE PROCESSING CONCEPTS with active project participation. Responsibilities will include:

- **Research and development of complex digital image processing systems utilizing state-of-the-art hardware, software, algorithms and techniques.**
- **Implementation of these new systems into production operation.**

Excellent income, comprehensive benefits, relocation assistence, and the advantage of our midwestern lifestyle await you. Join Technicolor, Graphic Services, Inc., a wholly owned subsidiary of Technicolor, Inc., Hollywood, California, for an exciting career opportunity at the EROS Data Center. FOR PROMPT AND CONFIDENTIAL CONSIDERATION, OR ADDITIONAL INFORMATION, SEND RESUME TO.

Mr. J.C. Pfliger

TECHNICOLOR GRAPHIC SERVICES, INC.
P.O. Box 1242
Sioux Falls, South Dakota 57101
An Equal Opportunity Employer M/F

The ROMAC DIFFERENCE

A Local Call Goes A Long Distance

Call or visit the Romac office nearest you, and make contact with our expert personnel consultants. Experienced executives constantly in-touch with key executives and top management in EDP, Accounting and Banking.

Your local call gives you access to Romac offices in 12 major eastern cities. You're not restricted to searching your immediate area. You have access to the best openings, in your industry as well as the best professionals available. All that for just a local call. That's the Romac Difference.

ROMAC
& ASSOCIATES/
Personnel Consultants

Contact Romac & Associates, A. L. Lemay, President; 2 Sun Life Executive Park, Wellesley Hills, MA 02181 for transmission to our Partners in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, New York, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford

---

MODELING ADMINISTRATOR

We have an immediate need in our main office, located in the Daytona Beach, Florida area, for an imaginative and self-motivated professional with:

- 5 YEARS DATA PROCESSING EXPERIENCE
- EXPOSURE TO TIME SHARING PRINCIPLES & FINANCIAL MODELING
- THOROUGH KNOWLEDGE OF APL
- A B.S. DEGREE IN BUSINESS ADMINISTRATION OR COMPUTER SCIENCE PREFERRED

If you feel that you are the qualified individual we seek for this challenging and growth-oriented position, we'd like to hear from you.

In addition to top starting salary we offer a full range of fringe benefits. Write, outlining experience and salary history, in confidence to:

Edie Bursso

COMMUNITY DEVELOPMENT CORPORATION
7370 NW 36th Street
Miami, Florida 33166
An Equal Opportunity Employer M/F

PROGRAMMERS
Scientific/Technical
INSTRUMENTATION APPLICATIONS CONTROL

Coulter holds a prominent position in the steadily expanding field of sophisticated automated instrumentation for clinical, medical, and related uses. Our environment offers a great deal of professional challenge combined with ideal facilities and atmosphere — everything to contribute to your realizing you best achievements and enjoying your work. Add to that our Florida location, and the delightful year-round living it affords.

Your experience should incude:

- **Minicomputers, Assembly or FORTRAN**
- **Familiarity preferably with PDP 8 or 8E, 8080 or Z80, T.I. 8008**
- **Minimum of 1-3 years of experience in instrumentation control or closely associated applications.**

Long-term outlook is excellent, salaries and benefits attractive. Please send resume, detailing your experience, and indicating salary progression, in confidence to:

EMPLOYMENT MANAGER
COULTER ELECTRONICS, INC.
650 West 20th Street, Hialeah, Florida 33010
An Equal Opportunity Employer M/F

SYSTEMS ANALYST

Chloride Incorporated, a progressive international corporation, seeks a systems analyst located in Kansas City. Applicant will work with a diversified teleprocessing network linked to the corporate central computer in Tampa, Florida. Application experience in manufacturing and general accounting systems desirable. Excellent salary and numerous fringe benefits. Send resume in confidence to:

D.P. Manager
P.O. Box 24598
Tampa, Florida 33623

REGIONAL SYSTEMS ENGINEERS

SWEDABILITY

It's what we're looking for in our Regional Systems Engineers.

Ambition and confidence. They're part of what we call Swedability. They help make us one of the most progressive divisions of Litton Industries.

Swedability represents the difference between just competence and excellence. We build it into all our electronic cash register and Point of Sale systems. And we look for it in the people who work with us.

Right now, we need more Regional Systems Engineers who really know their business. We require people experienced in minicomputer Assembly language (NOVA a plus), data communication, POS applications; BS degree or equivalent. Will interface with customers in pre and post-sales support.

Travel is involved for these positions, located in:

• CHICAGO • DALLAS • LOS ANGELES
• NYC AREA (NORTHERN N.J.)

If you have the trait we call Swedability, we'll arrange for you to meet more people like you—in a local interview with our Regional Manager

Express your Swedability by rushing your resume to: Professional Development, SWEDA INTERNATIONAL, INC., 34 Maple Ave., Pine Brook, New Jersey 07058.

SWEDA
Litton INTERNATIONAL, INC.

Equal Opportunity Employer M/F

HONEYWELL 6000 SYSTEMS PROGRAMMER

Unique Opportunity For Top Notch

Honeywell 6000 Systems Programmer...

Control Data's Peripheral Systems Group is seeking the right individual for systems software development utilizing a new peripheral in a large scale systems environment.

REQUIREMENTS:

Position requires 3 years of more experience in H-6000 systems programming, thorough knowledge of GCOS, GMAP, File Structures, I/O Level debugging, SCF, and master mode dump analysis is required. Knowledge of UFAS is desirable. Must possess good communications skills. Experience with structured methods is desirable.

THE JOB:

Key technical member of Control Data's growing OEM software development group. Individual selected will be heavily involved in design review and GMAP implementation activities. Emphasis on technical problems analysis and solution. Excellent opportunity to advance technical career.

If you desire a challenge and have the credentials, contact us today. Salary commensurate with experience, to $35k. We offer a liberal compensation and benefit package.

CONTROL DATA CORPORATION

Peggy L. Bernhardt
PERIPHERAL SYSTEMS GROUP
2200 Berkshire Lane
Minneapolis, Minnesota 55441
(612) 553-4720

An Affirmative Action Employer M/F

INFORMATION SYSTEMS MANAGER

Coordinate all information processing and systems development activities for a 400 bed Indiana Hospital. Requires demonstrable knowledge of hardware and software utilized in hospital information systems, including information networks and the use of minicomputers as distributed processors. Masters degree in computer science or hospital administration with computer and information systems experience is required. This is a senior level position. Salary commensurate with experience.

Direct inquiries or resumes to:

H.R. Porter & Associates
119 Executive Park
Louisville, Kentucky 40207

---

energy

WE NEED QUALIFIED DATA PROCESSING PROFESSIONALS

BIG SKY COUNTRY

See What Montana Has to Offer

- OUTDOOR RECREATION AT IT'S BEST ...
  FISHING CAMPING
  HUNTING SKIING
  HIKING
- GLACIER NATIONAL PARK...
- YELLOWSTONE NATIONAL PARK...
- LEWIS AND CLARK CAVERNS...
- AND MUCH MORE

RAPIDLY EXPANDING MONTANA CORPORATION HAS POSITIONS AVAILABLE FOR:

Computer Engineer

SOFTWARE ENGINEERS (LEVELS II & III), WITH A WORKING KNOWLEDGE OF DISK AND TERMINAL ORIENTED COMPUTER SYSTEMS PLUS A SOLID BACKGROUND IN FORTRAN AND PL-I PROGRAMMING. BACHELOR'S DEGREE WITH 2-7 YEARS EXPERIENCE IN SCIENTIFIC OR COMMERCIAL ENVIRONMENT.

WE OFFER COMPETITIVE SALARIES, LIBERAL RELOCATION ALLOWANCES, AND AN EXCELLENT BENEFIT PROGRAM.

SEND RESUME IN COMPLETE CONFIDENCE TO:

MERDI
PERSONNEL MANAGER
P.O. BOX 3809
BUTTE, MT 59701
An Affirmative Action/
Equal Opportunity Employer

SR. SYSTEMS SPEC'S.

N.E. client expanding 1978 projects. Excellent oppty. for COBOL, JCL trained indiv's. to become involved in new DB/DC state-of-the-art projects. All relocation expenses paid by client. Starting salaries to $23,000 for min. 2 yrs. exp. (Fee paid). Contact Stan Durbas or Paul Meisener.

ROBERT HALF
PERSONNEL AGENCIES
111 Pearl St.
Hartford, Conn.
(203) 278-7170

New York London Tokyo

INTERGLOBAL is...

a subsidiary of a NYSE listed company, with an EDP service bureau placing Consultants throughout the United States and foreign countries.

To take advantage of our nearby and worldwide EDP opportunities, please submit your resume for inclusion in our worldwide computerized retrieval system, to our corporate headquarters in New York City.

Ralph Young
INTERGLOBAL
TECHNICAL SERVICES, INC.
56 W. 35 St, NY, NY 10001
(212) 695-7773
Equal Opportunity Employer, M/F

FIELD SERVICE

SYSTEMS	370/360, H-200, XDS, Univac, CDC All Large & Medium CPU's
MINI's	PDP, NOVA, G.A., HP, etc. All Mini Systems
I/O	STC, TELEX, CDC, ITEL, CALCOMP, etc. All Peripheral Experience

MTTR
(312) 344-6750

MTTR ASSOCIATES
1107 Mannheim Road
Westchester, Ill. 60153

$12-30K

Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

---

performance analysts

Sperry Univac has immediate openings for Performance Analysts looking for challenging and exceptional career opportunities.

These openings exist in our Marketing Services organization located in the Minneapolis/St. Paul, Minnesota area which has an in-house, multi-system facility used for domestic and international marketplace. This is a dynamic marketing environment where you will enhance your experience by working with a wide range of Univac's most current product line.

We are looking for analysts with one or more of the following qualifications:

- 1-3 years user level orientation to 1100 applications, Computer Science, Engineering, or Math degree desirable.
- 1-3 years experience with other manufactuers' large scale equipment applications.
- Experience in performance measurement desirable large scale equipment or mini's
- A hardware background with an interest and aptitude to learn software. (Some positions may require travel)

If you possess any of the above, please submit your resume and salary requirements to:

P.K. Vervais
SPERRY UNIVAC
P.O. Box 3525
St. Paul, MN 55165

SPERRY UNIVAC

An Equal Opportunity Employer M/F

EDP AUDITOR

Large, northern Nevada NYSE corporation is seeking an individual with broad based systems experience to perform EDP auditing on corporate Internal Audit staff.

Candidate should possess at least four years' programming/systems experience plus a background in either general or computer auditing. Excellent communication skills are necessary.

Position will involve audits of large scale installations and specific applications within a dynamic EDP environment. Excellent compensation package. Please submit resume with salary history in confidence to:

CW Box 1514
797 Washington St.
Newton, Ma. 02160

AN EQUAL OPPORTUNITY EMPLOYER - M/F

PROGRAMMER/ ANALYST

Become a part of the challenging and successful atmosphere at Memorex!

We have an exciting position available for a Programmer Analyst in our Engineering Computer Lab. This position is responsible for Engineering Application program support. A working knowledge of PL1, COBOL and FORTRAN and 2-3 years applications programming experience on IBM equipment is necessary. Experience with VM/370 a plus. College degree or equivalent experience.

Veterans your military experience may qualify you for this position.

For immediate consideration, please send a letter outlining your qualifications to Memorex Corporation, Dept. =EK-46, San Tomas at Central Expressway, Santa Clara, CA 95052. An Equal Opportuntiy Employer M/F.

MEMOREX

PROGRAMMER/ANALYST

Come Grow With Us In Sunny California

We are the newly created Western Division of an established consulting firm. We provide the business communities of Los Angeles and Orange County, Phoenix, Tucson and Albuquerque with the data processing expertise they require.

We are seeking new individuals with a professional attitude who have the experience and the ability to grow in the consulting environment:

This outstanding professional opportunity offers:

- Stimulating work environments
- A policy of internal promotions
- Professional and technical education
- Above average salaries
- A full paid benefits plan

Currently we have openings for individuals who have a thorough design and/or programming background with any of the following applications:

- Gas and electric utilities
- Banking and financial institutions
- Hospital accounting
- Manufacturing systems

Utilizing:

PL/1, COBOL, ALC, IMS (on-line/batch), CICS, TSO, SPF, OS, DOS, structured design/structured programming.

Please call, or send your resume to:

CIBER, Inc.
Consultants In Business/Engineering/Reserach
WESTERN DIVISION, INC.
3858 Carson, Suite 201
Torrance, California 90503
(213) 540-3210
(602) 248-0813
(313) 642-2900

CIBER

We Are An Equal Opportunity Employer, M/F

B6800/B7800 SPECIALIST

Major expansion at the Medical College of Wisconsin Computer Center has created the following immediate openings

CONVERSION SUPERVISOR

Bachelor's degree in Computer Science or equivalent. Must have been lead in prior computer conversion. Ideally conversion would have been to Burroughs large systems. DMS-II, GEMCOS knowledge desired. This is a permanent position for a supervisor in the Systems and Programming area

DATA BASE ANALYST

Bachelor's degree in Computer Science or related field with one-two years in application system design and analysis. Two years experience in data base technology. DMS-II knowledge desired

SENIOR SYSTEMS ANALYST

Bachelor's degree or equivalent with 3 to 4 years experience as a systems analyst DMS-II experience, hospital and/or educational applications background a plus

SYSTEMS PROGRAMMER

Bachelor's degree or equivalent with 2-4 years in systems programming, at least one year in B6700-B6800 systems support programming desired

ANALYST/PROGRAMMER

Bachelor's degree or equivalent; two years as programmer/analyst, experience with COBOL required. DMS-II experience desired

Applications are also being accepted for the following additional new positions scheduled to be filled between May 1, 1976 and July 30, 1978. Application deadline is April 30, 1978

ASSISTANT DIRECTOR

Master's degree in Computer Science, Business or related field preferred. Four years of management experience in data processing, with 2-3 years additional data processing experience. Burroughs experience a plus

MANAGER OF TECHNICAL SERVICES

Master's degree in Computer Science or equivalent experience preferred. Four-six years experience in data processing with at least two years of systems software experience

We offer an excellent starting salary, a comprehensive benefit package and outstanding growth potential. All resumes submitted must state position desired, references and salary history.

MEDICAL COLLEGE OF WISCONSIN
Computer Center
1725 West Wisconsin Avenue
Milwaukee, Wisconsin 53233

An Equal Opportunity Employer M/F

PROGRAMMING OPPORTUNITIES
370/On Line/ Minis/Telecom

If you are a COBOL programmer . . . on-line experience would be a plus, we offer challenge and opportunity for professional development in the corporate environment.

You will be involved in design and implementation of Information Systems' that impact the manufacturing, distribution and administrative functions of this diversied manufacturer of electronic equipment.

Further you will find . . .

- Recognition for your performance
- Compensation and Company benefits attractive
- Convenience of location - near Newark - Airport
- Free parking

For prompt consideration, send resume to

Federal Pacific Electric Company
150 Ave. L, Newark, NJ 07101
c/o Management Information Systems
or better yet
call
(201) 589-7500
Ext. 445

Equal Opportunity Employer M/F

COMPUTER/ELECTRONICS SPECIALIST

Exceptionally qualified person to establish and direct PDP-11 minicomputer network, including DECLAB 11/34 system and several 11/03 microcomputer satellites. Responsibilities include: implementing initial system software, developing software package to run and analyze psychology experiments, writing other specialized programs, designing interfaces for peripheral devices. Experience with PDP-11 family and solid electronics background necessary; experience with psychology applications preferable. Salary negotiable. Write: Chairman, Psychology Department, Mezes Hall 330, University of Texas at Austin, Austin, Texas 78712. An Equal Opportunity/ Affirmative Action Employer.

COMPUTER PERSONNEL

PROGRAMMERS/ANALYSTS

Business Applications, Management Information Systems

Data base information systems experience with inventory control & accounting background. Financial application background & distribution processing desirable. Computer Science Degree preferred, Business Degree with related experience acceptable. Exposure to mini-computer environment desired. Duties include software development support. These positions require 1-3 years experience.

These and other key opportunities are fee paid. Please send resumés for consideration to:

TVN ASSOCIATES
P.O. BOX 602
MARBLEHEAD
MASSACHUSETTS 01945

Representing America's Foremost Companies For Over Fifteen Years

---

SUN BELT

Outstanding career growth positions available with FORTUNE 500 Clients. Client companies are leaders in their industries and offer excellent career path progression, ideal living conditions. Enjoy your work and a better life style. Partial list of current position openings: All positions are fee paid (including relocation and interview expenses):

LARGE SCALE IBM

Programmers COBOL OS/DOS	$ 13-17K
Prog/Anal COBOL OS/DOS	$ 15-24K
Sys Analysts IMS/VS	$ 17-24K
Proj Ldrs	$ 18-26K
Sys Progs SYSGEN MVS	$ 20-26K
Sr Sys Prog (s) MVS	$ 22-28K

Partial List Only
CONTACT BILL DENNY, V.P.

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 Ext. 605

(In MO 1-800-892-7655)

Jim King and Associates

438 Gulf Life Tower/Jacksonville, Florida 32207
(904) 398 7371

SOFTWARE SALES REP

A rewarding combination: our fast-paced BCS sales team and your selling expertise

Here is an exceptional opportunity to further expand your career horizons. Become an active participant in the dynamic business growth of Boeing Computer Services . . . a recognized leader in providing high quality, cost-effective computing services.

You may qualify to market our Executive Information Services (a financial applications product) if:

- You have a proven record in software product sales
- You are familiar with DOD, NASA and DOE facilities in the metropolitan Weshington aree
- You have some knowledge of GSA Teleprocessing Services Program

Successful candidate will join our Space, Energy and Military Applications Group and be based at our Fells Church, Virginie, office.

Excellent total compensation plan with comprehensive company-paid benefits.

For immediate consideration, please send your resume including earnings history to Gordon E. Grant.

BCS BOEING COMPUTER SERVICES COMPANY

A Division of The Boeing Company

7926 Jones Branch Drive
McLean, Virginie 22101
An Equal Opportunity Employer

CONSULTING SYSTEMS ANALYST-PLANNER

We're seeking a consulting systems analyst to join our Indiana-based consulting firm at a senior level.

The position requires a managerial perspective and outstanding communication skills due to the direct work with clients' management in data processing master and systems planning engagements.

We offer an exciting, creative work environment, minimal travel, and full benefits including a bonus program in addition to a starting compensation in the high thirties. Resumes and cover letters should be addressed to the attention of the President:

CW Box 1524
797 Washington St.
Newton, MA 02160
An equal opportunity employer

PROGRAMMER/ANALYSTS

Kranzley and Company, a leading systems development firm, requires professional personnel in the following fields:

APPLICATIONS PROGRAMMING

- COBOL — 2 years or more
- OS/VS or DOS/VS
- Financial, accounting applications a plus

TELEPROCESSING — if your skills range over the following:

- BAL — 3 years or more
- OS/VS or DOS/VS or Minicomputer
- CICS or equivalent T.P. Monitor
- Sysgen experience a plus
- Data base access methods
- Communications line control and access methods

DATA COMMUNICATIONS — if your skills range over the following:

- Line protocols
- Front-end processors
- Network design and simulation
- Line servicing routines

For consideration, send your resume or call —

Kranzley & Co.

1010 South Kings Highway
Cherry Hill, New Jersey 08034
609 795-1515

AN EQUAL
OPPORTUNITY
EMPLOYER

DATA BASE ADMINISTRATOR
LOUISIANA STATE UNIVERSITY

Minimum Qualifications: College graduate with at least five years of data processing experience, two years of which must be in data base design or administration. Preference given to experience in IMS, DLI, DC, and large systems. Successful candidate will control data base activities at LSU and will supervise the activities of one junior DBA The salary is very competitive with a 3033 support computer. Send confidential resume to:

Dr. John M. Tyler
System Network
Computer Center
Louisiana State University
Baton Rouge, LA 70803
An Equal Opportunity
Affirmative Action Employer

PROJECT LEADER

Responsibility includes designing, organizing and analyzing projects for academic departments, requires B.A. and considerable data processing experience including 3 years in programming in a compile level language with technical analysis, salary is 19,825 plus excellent fringe benefits, send resumes by April 14, 1978 to Wayne County Community College Personnel Office, 4612 Woodward Detroit, MI 48201

An Equal Opportunity/
Affirmative Action/
Title 9 Employer M/F

OPERATIONS MANAGER

This assignment provides a full range of responsibilities associated with data processing operations. General qualification. Good verbal and written communications. Minimum two year operation management experience. Good attitude. Salary to mid twenties. Company provides good benefits, state of the art equipment (large IBM, PDP mini computer, and on line systems). For immediate consideration call collect

(412) 734-0920
S.A. MORTELL
ASSOCIATES
700 California Ave.
Pittsburgh, PA 15202

SYSTEMS PROGRAMMERS

Experience in systems generation and maintenance particularly using VS1 will be helpful in securing this ground floor software position in the beautiful Pacific Northwest.

CICS/VTAM/ADABAS/WYLBUR experience also useful. Computer due for installation in October. Salary commensurate with proficiency. EOE

Send resume and salary requirements to

Ken Ashcraft
Supreme Court of the
State of Weshington
Office of the Administrator
Temple of Justice
Olympia, Washington 98504
Phone (206) 753-3365

--SYSTEMS--
--PROFESSIONALS--
--NATIONWIDE SERVICE--

Sys Dev Mgr To $38K
SO EAST MFG BILL $+ CORP LARGE IBM, HIGH VISIBILITY

PROJ MGR To $29K
NO. EAST MFG SHOP FLOOR, MRP, 370

Bus Sys Mgr To $37K
MIDWEST BILL$ CORP HDQTRS MFG, FINCL MIX

Reinc & Fees Paid by Client Co.,

O-R-T-U-N-E
DATA

Div Fortune Persnl Agency
505 5th Ave, NYC 10017

(212) 682-8600

Company Inquiries Invited

EDP PROFESSIONALS

EXCELLENT OPPORTUNITIES WITH "BIG 8" CPA FIRM

Positions in Philadelphia, Washington, D.C. and Pittsburgh for highly motivated EDP professionals with our Computer Audit Assistance Group (CAAG). Individuals will advise and assist in audits of clients using computers.

REQUIREMENTS:

- Minimum of 3 to 5 years background in business and financial applications.
- Proficiency in COBOL, OS JCL and IBM 360/370 operations (dumps, utilities, etc.).
- Familiarity with data base operations (IMS, TOTAL) a plus.
- Ability to communicate orally and in writing is essential.

Salary commensurate with experience. Send resume with salary history in confidence to:

CW box 1514
797 Weshington St.
Newton, MA. 02160
Equal Opportunity
Employer M/F

SENIOR SYSTEMS PROGRAMMER

We are seeking candidates for a Senior Systems Programmer position. The individual selected will have responsibilities in support of diverse SCP software in an MP environment: i.e., MVS, TSO, CICS/VS, DL/I, DOS/VS.

* Excellent Benefits

* Permanent Location

Send Resume to:
PERSONNEL DEPARTMENT

FEDERAL RESERVE BANK OF DALLAS

STATION K
DALLAS, TEXAS 75222
(214) 651-6304
Equal Opportunity Employer M/F

CUSTOMER FIELD ENGINEER

This is the year for you and for Memorex. For Memorex it's the year we'll see the real benefits of the efforts which made the last 2 years record years for sales. It's the year that Memorex re-established itself as the world leader in the design and manufacture of high-quality products used in data processing, data communications, vital record storage. For you it can be the year of opportunity. An opportunity to become part of a company moving in very exciting directions.

Because of our success, we have an immediate need for a Customer Field Engineer for Central and Northern New Jersey region. This position involves working on computer peripherals and telecommunications equipment. To qualify, you should have at least 2 years experience in teleprocessing, disc, or tape equipment. Some CPU 360/370 or Systems 3 experience and a good customer contact appearance are also important. You will be trained on Memorex equipment and assigned to a customer location. We offer an excellent salary and outstanidng benefits package.

To arrange an interview appointment, please send a resume or call Sten Geng at (201) 325-1830. Memorex Corporation, 59 Mein Street, West Orange, New Jersey 07052. An Equal Opportuntiy Employer M/F.

MEMOREX

Programmers and Programmer/ Analysts

Gilbert/Commonwealth, a leader in power plant design, has immediate openings for application programmers and programmer/analysts in its IBM 370 MVS Data Processing Department. Applicants should possess a minimum of one year programming experience in PL/1 and/or Fortran. In addition, the programmer/analyst positions require experience in system and detail design.

Located in a desirable living/working area in Jackson, Michigan, these positions offer an attractive starting salary and benefits package along with opportunity for meaningful professional growth. Send your resume along with salary requirements in confidence to David C. Enslin, Section 35-4M, 209 E. Washington Ave., Jackson, MI 49201.

Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading, PA/Jackson, MI
An Equal Opportunity Employer

Data Processing
SYSTEMS SOFTWARE SECURITY SPECIALIST

Virginia based bank holding company seeks highly motivated individual to establish procedures and controls to insure integrity and security of Computer Hardware and Systems Software. Responsibilities to include the planning and scheduling of reviews for EDP Systems, Software and Systems procedures, the preparation of short term and long range audit plans and other related functions. Minimum 3-4 years systems programming is preferred. Degree in Computer Science is required. Must heve thorough knowledge of ALC programming and familiarity with COBOL. IBM 370 DOS/VS GRASP environment. Excellent salary and benefits package. Submit resume with salary requirements to:

CW Box 1511, 797 Washington St., Newton, MA. 02160.

Equal Opportunity Employer M/F

PROGRAMMERS

FLORIDA OPPORTUNITIES

Join the 32-bit Super Mini Leader!

REAL-TIME ASSEMBLY LANGUAGE Programmers with experiance in the following areas ara invited to share in our success:

- OPERATING SYSTEMS
- INTER C.P.U. COMMUNICATIONS
- DATA BASE COMPILER DESIGN
- FIRMWARE DESIGN
- MAN MACHINE INTERFACE

Systems Engineering Laboratories is a dynamic, fast-growing computer manufacturer located in a very desirable suburb of Ft. Lauderdale, Florida. We offer health and dental plan along with 100% tuition refund program and completely paid relocation.

Please send resume and current or last salary to Frederick J. Brillante.

SYSTEMS
ENGINEERING LABORATORIES
6901 West Sunrise Blvd., Fort Lauderdale, Florida 33313
Equal Opportunity Employer Male/Female

PROGRAMMERS TO M.I.S. MANAGERS

SALARIES: 8K to 30K
LOCATIONS: NH, MA, VT, ME

We would like to discuss your next career move. Our needs cover all languages, applications, and hardware. All fees paid, free resume update. We are available for evening interviews. Call or send resume to SOFTWARE GROUP.

CORICO CORP.
EDP RECRUITERS
301 South Broadway
Salem, NH 03079
(603) 893-4511

Sr. Systems Analyst Manufacturing $21,000-$24,000

Exeter Associates
Executive Recruiters
Bruce A. Montville
P.O. Box 623
Computer Park
Hampton, N.H. 03842
(603) 926-6712

CENTRAL FLORIDA

Programmer-COBOL	$25K
Systems Mgr-Sr. Level:	$25K
Software Specialist:	$25K
Comp 10 Specialist:	$25K
Programmer Analyst:	$20K
Programmer Fortran:	$20K
Software Analyst:	$19K
Systems Mgr. Jr. Level:	$18K
Field Engineer:	$16K
Programmer Assembly:	$15K
Computer Operator:	$13K

Call or Send Resume
(305) 894-6551
Data Processing Dept.
C/M of Orlando
3101 Maguire
Orlando, FL 32803

Our broad and growing product line requires additional
PROFESSIONALS
in intelligent & non-intelligent
DATA COMMUNICATIONS TERMINALS
Positions available include:

Systems Engr's
Sales Support

Sr. Software Systems Designers

Engineers
Product or Applications

Salesmen/w
Data Terminals

EXCELLENT SALARIES
in a growth oriented company. Write or call Personnel Dept. (800) 631-7050. In N.J. call collect 529-1170

western union data services
70 McKee Drive
Mahwah, N.J. 07430
Equal Opportunity Employer M/F

SOUTHWEST PROG/ANALYST

Health Care Environment
NCR Criterion 8550
Neat/3 COBOL
Experience a Plus

- Excellent fringe benefits
- Salary commensurate with experience
- Immediate Health & Life Insurance Coverage
- Unique paid vacation system

Send Resume to:
CW Box 1519
797 Washington St.
Newton, MA 02160
An Equal Opportunity Employer

The MICOR Connection!

PERSONNEL RESOURCE CORPORATION has the details about MICOR . . . a **Phoenix** based growth oriented corporation designing Advanced Systems & Terminals to support high reliability, On-Line Real Time Data Communications Networks.

CURRENT NEEDS INCLUDE . . .
Communications Systems Programmers: MICOR is expanding its development staff in the areas of EFT and High Volume Transaction Processing Networks, and is particularly interested in individuals with Network Architecture, Operating Systems, High Availability Data Base Systems and Communication Systems design and implementation experience.

MICOR OFFERS . . .
The skilled professional an opportunity to pursue development and implementation of their ideas in an environment of unusually rapid Technological advancement.

MICOR OFFERS . . .
The climate, life-style and cost of living advantages in a desirable sunbelt location, Phoenix, Arizona.

For complete information concerning this and other Data Processing opportunities with MICOR . . . call PRC today!

Call Toll Free
Ask for Bob Dirickson or Robert Bertling
1-800-528-6037

PRC
Personnel Resource Corporation
PRC Concord Building, 3829 North Third Street
Phoenix, Arizona 85012 (602) 248-0010
CORPORATE PARTNERS IN MANAGEMENT SEARCH!
equal opportunity employer M/F

DEC SYSTEM 10 AND 20 EXPERTS

Our DEC-20 Business is Growing Rapidly And We Need Your Skills

AMS has four openings in its Special Projects Group in Arlington, Virginia. This team is responsible for the design and implementation of applications on our new DEC System 20 which has a variety of system and application software such as: System 1022 (a data base system), MAPS (a financial modeling package), DISSPLA (a graphics package), TRAFFIC-20 (A CRT screen formatting the transaction routing package), SCSS and SPSS, Basic + 2, COBOL, FORTRAN, MACRO, Relational DBMS, and a DEC-20/IBM 370 interface. Types of applications currently being developed or planned for the near future include inventory, association membership, convention registration, accounting, budgeting (financial modeling), personnel (project staffing/skills inventory), and document indexing.

We seek programmer analysts with 2-5 years of application systems development experience, and at least one of which is on the DEC System 10 or 20. We prefer candidates with a Bachelor's degree in Computer Science or Information Systems. The ability to work with clients and to design and program systems is essential. We do not want people who wish only to design but not to program; nor do we want people who are unable to work effectively with clients.

The Special Projects Group is an expanding business unit with 12 professionals. AMS is a growing consulting and computer systems development firm which in 8 years has built its business to over $21 million per year in sales; and 1978 sales are expected to exceed $30 million.

If you are interested in a challenging, rewarding career opportunity, please send your resume and salary history to Dept. 20:

Mr. Frank A. Nicolai
Executive Vice President

ams
An Equal Opportunity Employer M/F

American Management Systems, Inc.
1515 Wilson Boulevard
Arlington, Virginia 22209

Offices in New York, Chicago, Detroit, San Francisco

Marketing Manager

We need an individual who has demonstrated the ability to manage the people and the diverse elements of a major marketing effort in computer and information display.

Substantial experience in computer product marketing is required. A strong technical background, plus demonstrated marketing skills, is necessary. Marketing skills in actually creating and executing marketing programs should be evident in your history. Formal training might be BSEE or BSCS and MBA.

Tektronix, Inc., is a rapidly growing Fortune 500 Company that develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Art Andersen, TEKTRONIX, INC., P.O. Box 500, O27, Beaverton, Oregon 97077.

An Equal Opportunity Employer M/F/H.

Tektronix
COMMITTED TO EXCELLENCE

SYSTEMS ENGINEER
Northern Vermont

Immediate opening in a Company pursuing research and development of aerospace systems.

The applicant we seek must have experience with business systems design. You will be working with a Distributed Mini Computer System providing Engineering and Administrative support. A BS/MS in Computer Sciences is desirable and experience in Engineer problem solving is helpful.

The position offers a salary commensurate with experience and full company benefits.

Send resume and salary history in confidence to:

Personnel Department
SPACE RESEARCH CORPORATION
P.O. Box 60
North Troy, Vermont 05859

(Equal Opportunity Employer)

EDP Professional

We are looking for an EDP oriented individual familiar with life insurance systems concepts to work in our expanding EDP audit department. This individual should have 3-4 years' experience in systems/programming or equivalent experience in a highly technical EDP auditing environment. Familiarity with life insurance accounting principles desirable but not necessary. Experience should include working in an IBM 370/DOS environment and have a thorough understanding of JCL/COBOL. This position requires a maximum of 25% travel (no weekends) with the home office in Northern New Jersey. We offer an excellent starting salary and complete company benefits, as well as good opportunity for advancement. Please send resume including salary history in confidence to: Employment Supervisor.

CHUBB

CHUBB & SON INC.
51 John F. Kennedy Pkwy.
Short Hills, N.J. 07078
Equal Opportunity Employer M/F

CUSTOMER ENGINEER
(Technical Specialist)

Two year minimum experience servicing Basic/four computers. Experience in other equipment highly desirable. For additional information, please send resume to:

MAI Del Caribe, Inc.
P.O. Box 8457
Santurce, Puerto Rico 00910

VIRGINIA

Sr. Systems Analyst
Project Leader
$22,000 to $26,000
All expenses Paid by Co.

Will lead 4 analyst 1st. year. 8-10 analyst 2nd yr. Need Manufacturing background, Prod. cost, BOMP, MRP. Multi processor 370 installation. High level of Technology.

Call or Send Resume to Data Processing Dept.

PERSONNEL PLACEMENT
537-D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-5591

CORP-FINANCIAL SYSTEMS ANALYST SALARY TO $30M

Major Pacific North West Co. seeks person with Big 8 exper. prefer MBA or Accounting degree. Desire systems design of financial sys in large corp environment. Call Mr. Weil

(405) 525-8833
EDP SEARCH
2401 NW 39
Okla City 73112

PHILADELPHIA
TELECOMMUNICATIONS SYSTEMS PROGRAMMER
TO $25,000

Leading PHILA area INDUSTRIAL conglom reqs min 2 yrs in COMMUNICATIONS SYSTEMS w/ASSEMBLY proficiency..NCP & TP ACCESS METHODS exposure a +. Respon installation, maintenance & troubleshooting of new communication systems. Co has duplex 370/168's SVS/HASP & VM to service CORP CMS & RJE USER community throughout country. A unique oppty to work in the most sophisticated state of the art environ.

For immediate, confidential attention; please call or forward resume to:

ROBERT HALF
PERSONNEL AGENCIES
2 Penn Center, Suite 706
Philadelphia, PA 19102
(215) 568-4580

SENIOR SYSTEMS ANALYST UTICA, NEW YORK OPPORTUNITY FOR PERSON WITH 4 OR MORE YEARS EXPERIENCE IN DESIGN & IMPLEMENTATION OF COMPUTERIZED MANUFACTURING SYSTEM.

Attn: F.W. Gaw
Tool Division of
Chicago Pneumatic Tool Co.
501 Bleeker St.
Utica, N.Y. 13503

Equal Employment Opportunity M/F

MIDWEST'S FINEST

We're looking for self-motivated, results-oriented professionals with a proven record of accomplishment. You may qualify for one of these positions: P/A CICS, IBM 360 or 370, COBOL, S/A, Data Base, T-SO, BAL, VS/VM: This is an alternative to boredom and stagnation. For confidential consideration, forward resume, or call Vicki Anderson, EOP Specialist, Snelling & Snelling, 1415 Directors Row, Suite 12A, Ft. Wayne IN 46808. (219) 482-1511. A licensed employment agency.

DATA BASE/ DATA COMMUNICATIONS TECHNICAL SUPPORT
Join Us in The Sun

Burger King is seeking an individual with DB/DC technical experience to support the design and implementation of a corporate information system.

Requirements:
- demonstrate DB design, installation and tuning success
- present at least a 2 year DB background in IMS or TOTAL
- an IBM 370 hardware, and OS/VS software background
- telecommunications experience helpful
- systems technical support background helpful
- degree preferred

Call toll free (800) 327-1990 or send resume with salary history to: Bob Brodie. The best qualified candidates will be contacted by April 21st.

Burger King Corporation
P.O. Box 520783
Miami, Florida 33152
An Equal Opportunity Employer M/F

BURGER KING

San Francisco

Any BLIZZARDS lately? If you are a skiier, we have snow too, within a four hour drive you will have your choice of some thirty ski areas — plus excellent stage shows and games of chance — if that's your bag ... Why not combine a vacation trip to our city, enjoy the Spring skiing and — incidently — talk to our clients. Let us arrange your interviews in advance.

ASSEMBLY LGE. APPLICATIONS PROGRAMMERS. IBM 370

For on-line CRT, "Light Pen" medical systems. Many positions.

EDP AUDITOR

Sought by prestigious firm to establish new section. Exclnt. opportunity for data processor with acctg. bkgrd. and some audit exp. $22,-$22,500 + car.

TELECOM. ANALYST

To design and implement Voice and Data Communications Network. PBX exposure preferred. $21-24,000.

SOFTWARE/APPLICATIONS

Our clients need a top level, client support oriented consultant with solid technical skills in; systems programming (IBM 370/OS), applications programming (COBOL), with broad bkgrd. in a variety of commercial applications at the Sr. Analyst/Project Leader level. $22-28,000.

COBOL PROGRAMMERS

With one or more years exp. Our clients will train you in IBM 370/OS/IMS on-line, teleprocessing environments. Salary varies with exp. $16-24,000.

ROBERT HALF PERSONNEL AGENCIES, INC.

Jerry Anderson
111 Pine St.
San Francisco, CA 94111
(415) 434-1900

Stan Ings
#2 Palo Alto Sq.
Palo Alto, CA 94304
(415) 493-8700

TECHNICAL INSTRUCTOR

TRW Information Services is presently offering an excellent career opportunity for an individual in the technical training profession. Selected candidate will be responsible for the development, selection and presentation of technical training material as well as assisting in the definition of data center training requirements and the development of related planning documents.

Previous DP training experience with an emphasis on computer operation and hardware courses plus 2 or more years operating/programming experience is required. Demonstrated ability to effectively communicate with all levels of management and students in a classroom environment is essential.

Interested and qualified candidates are invited to send thier resume including salary history in confidence to: "Technical Instructor", Human Resources Department.

TRW INFORMATION SERVICES

505 City Parkway West
Orange, California 92668

P.O. Box 6230
(714) 937-2487

We are an equal opportunity employer M/F/H.

PROGRAMMERS AND ANALYSTS
Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

NEWSPAPER EDP PROFESSIONAL

Ara you a data processing professional seeking corporate responsibility as a staff consultant with a large, national-group of newspapers? You should be familiar with newspaper operations and have a background which includes a wide variety of data processing applications. Experience with H-P 3000 snd IBM 370 computers is desirable.

Rasponsibilities will include coordinating hardware and software selection, performance, installstion snd implementation as new requirements surfsce periodically at different plants.

This position raquires a self starter who has good communicative snd writing skills snd is seeking a career position offering exciting challenge with excellent salary and benefits.

If you qualify for this position, send your resume, including salary history, to CW Box 1507, 797 Washington St., Newton, Ma. 02160.

DISTRICT SALES MANAGER

Our client company is looking for e professionel with a successful sales track record in the finenciel epplicetions field. Also, 2-3 yeers productive seles menager experience end an edvenced degree in business is a reel asset. Extremely ettractive selery. Plus override on District. Totel compensetion peckage up to $45K.

Please forwerd resume with salary history or call collect, person-to-person to

Mr. John D. Jorge or Jemes A. Love et
(513) 721-0909
C/O Professions Unlimited
35 E. 7th St.
Ste. 201, Cinc., OH 45202

All fees, interviewing & relocetion fees paid by client compenies. All responses held in strictest confidence.

SYSTEMS ANALYSTS

Career opportunities in Systems Development for bank applications. Must have good writing skills. We require: 2-3 years COBOL programming end 2-3 years Systems Analysis and Design and s knowledge of medium scale computer systems. Banking experience and knowledge of ATM's and on-line terminal epplications desirable. Submit your resume listing salary requirements to Personnel Department.

10 S. Market Squara
P.O. Box 1010
Harrisburg, Pa. 17108

Commonwealth National Bank

Equel Opportunity Employer M/F

PROGRAMMER/ANALYST

Southfield, Michigan

A netionally recognized leader in health cere edministration systeme ia seeking an experienced, self-starting individual lo join ita data proceesing steff. Primary reeponsibilities would include analysie and program development of the company's on-line teleprocessing systems.

You muet heve a minimum of two-three years experience using IBM Assembler and COBOL, and OS/VS JCL. Experience in on-line transaction proceasing systems a plus.

The compeny offers excellent working conditions, benefits and growth opportunitiee. Please send your resume with salary requirements to Martin F. Whelsn at:

DELTANET, INC.
P. O. Box 559 Southfield, MI 48075
Equel Opportunity Employer M/F

SYSTEMS MIS INTERNAL CONSULTANT $30,000 PLUS

Fortune 300, suburban based, Internetionally known manufacturing firm needs understudy for MIS Meneger. Must heve systems design beckground in either Menufecturing, Finenciel, Merketing or Communications ereas. Veried duties include Speciel Projects Meneger, Feasibility Studies, Herdwere & Software Evelueticns & Proposels. (Lerge Scele to Mini's), Systems Plenning & Development. Must be effective communicetor orel & written. Will travel (Netionall, consult with top level users, corp & divisions. Someone with five yeers experience eerning $20-$28,000 can expect 25% increese. Plens for expension offer excellent career growth to serious minded, embitious end industrious cendidete. Resume not required, to discuss contact:

DAVE TAIT &
FRANK McGINTY
EDP SPECIALISTS
(914) 946-1227

TRI-STATE STAFFING ASSOC.
1 N.BWAY,
WHITE PLAINS, NY 10601
NO FEES AGENCY

COMPUTER PROGRAMMER

Chellenging opportunity in e progressive heelth care environment on the Alebeme Gulf Coast. Duties will include writing testing, implementing end documenting progrems in PL/1 end COBOL; constructing job streem using DOS/VS JCL for execution. Minimum requirements include e bachelor's degree in Computer Science of a releted eree and 1 year of programming experience. Selery commensurete with experience end exceptionel benefits. Reply to:

Office of Personnel Reletions

UNIVERSITY OF SOUTH ALABAMA
307 University Blvd.
Mobile, Ale. 35858
An EOE M/F

COMPUTER PROGRAMMER

To work in the development of on-line epplicetions in e Burroughs 4700 Medium Systems environment. COBOL programming experience is required. Experience in eny of the following erees is desireble.

- Burroughs FORTE/2 Dete Base System Softwere
- Burroughs Medium System NDL
- Finenciel end/or Student Accounting Systems for en educetionel institution.

Send resume, selery history, end salery requirements, by April 21, 1978 to:

Kenneth P. Ven Kemmen
Dete Processing Meneger
Gatewey Technicel Institute
3520 - 30th Avenue
Kenosha, Wisconsin 53141
Gatewey Technicel Institute is an Equel Opportunity Employer/Progrem.

GROUP MANAGER EUROPE

Mejor internat. computer mfr. seeke dete processing "pro" with min. 10 yrs. exp. in eutomated betch, real time, telecommunicetions, end interactive businese systeme. Muet have previouely meneged large technicel group. Requiree ebility to gresp corporate overview. BS required, MBA preferred. Selery to $50,000 (Fee Paid). Contact Gerry Bettista.

ROBERT HALF PERSONNEL AGENCIES
140 Federal St.
Boston, Mass. 02210
(617) 423-6440

MCAUTO

NATIONWIDE DATA SERVICES

Professional Career Opportunities

MCAUTO (McDonnell Douglos Automotion Co.) one of the notion's leoding doto services companies, hos numerous openings in Long Beach, Californio ond St. Louis, Missouri for computer ond doto processing professionols. MCAUTO provides services for commerciol clientele throughout the world ond hos enjoyed increased sales ond profitobility every year since its beginning in 1960.

Some of our requirements include:

- **Business Application Programmers**
- **Scientific Application Programmers**
- **Word Processing Consultants**
- **Communications Analysts**
- **Financial Services Consultants**
- **Systems Analysts (Accounting and Financial background desirable)**
- **Manufacturing Systems Consultants**
- **Distribution Systems Consultants**
- **IBM Systems Programmers**
- **CDC Systems Programmers**
- **N/C-CAD/CAM Programmers**
- **Graphics Device Specialists**
- **Piping Engineer Consultants**
- **Structural Engineer Consultants**
- **Civil Engineering Consultants**
- **Sales and Sales Trainees Openings Throughout the Country**
- **Interactive Computer Graphics**

You should consider thot MCAUTO is completely dedicoted to keeping current with the stote-of-the-ort, is exclusively in the doto services business, ond provides you the opportunity to work with clients in oll types of industries.

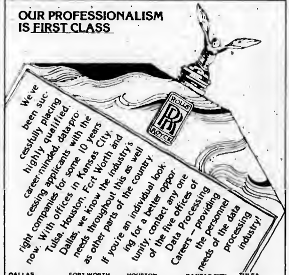
Our employe benefits, competitive solory, educotion support, ond efforts to provide you job sotisfoction ore the best thot onyone in the industry con offer.

Send your resume ond solory history in confidence to:

C. W. Rebuck • MCAUTO
3855 Lokewood Blvd. • Dept. K2-051-CW
Long Beach, CA 90803

MCAUTO
A DIVISION OF MCDONNELL DOUGLAS
An Equal Opportunity Employer

OUR PROFESSIONALISM IS FIRST CLASS



We've been successfully placing highly qualified, career-minded, data processing applicants with the right companies for some 10 years now. With offices in Kansas City, Tulsa, Houston, Fort Worth and Dallas, we know the industry's needs throughout this as well as other parts of the country. If you're an individual looking for a better opportunity, contact any one of the five offices of Data Processing Careers — providing the personnel needs of the data processing industry!

DALLAS
Suite 1109
Stemmons Tower West
Dallas, TX 75207
(214) [illegible]

FORT WORTH
Suite 911
One Summit Avenue
Ft. Worth, TX 76102
(817) [illegible]

HOUSTON
Suite [illegible]
4615 Southwest Frwy
Houston, TX 77027
(713) [illegible]

KANSAS CITY
Suite 902
6405 Metcalf
Shawnee Mission
Kansas 66202
(913) [illegible]

TULSA
Suite 10
Park 21 Building
[illegible] East 21st St
Tulsa, OK 74114
(918) 747-[illegible]

DATA PROCESSING CAREERS

Leading technology-based market research/consulting company has position for its Computer Division. Candidates should have a graduate degree and a bland of business interests and computer experience; in addition they should be objective oriented end highly motivated. The position offers e genuine opportunity to make use of a broad range of skills and interests.

Send resume to Dr. Jean-Michel Gabet, GNOSTIC CONCEPTS, INC., 2710 Sand Hill Road, Menlo Park, California 94025.

SYSTEM ANALYST

Excellent professional growth opportunity for individual experienced in system design and implementation. Responsibilities include feasibility studies, general design, davalopmant and installation of financial and administrative systems. Experience required with 370/168-MVS, COBOL, JCL; preferred CICS/VS, MARK IV, TSO, WYLBUR. One year minimum analyst experience with good verbal and written communication skills; degree prefarred. Paid benefits include 25 days vacation yearly and health/life insurance. Please send resume and dasirad salary to:

DeLores Stratton

University of Illinois
Madicat Canter
Personnet Services
P.O. Box 8889
Chicago, Ill. 60680
an equal opportunity employer

Pacific Northwest

Data Base Administrator

Our client, e prominent manufacturer, is seeking a seasoned professional to be responsible for the evaluation, design and implementation, of data base management systems. Knowledge of DL-1, exposure to multi DBM's, experience in date dictionery definition is preferred. Will supervise and communicate with sophisticated users. 25K to 30K.

Systems Analyst

Leading company is seeking 5-7 years manufacturing systems experience including MRP, cost accounting, etc. IBM or OEC familiarity preferred. 24K-27K.

call Al Friedmen

Sales

Career positions open in N. Calif. and Pac. N.W. for EOP sales professionals.

Call Lou Jones

For immediate and confidential consideration, call either Mr. Friadman or Mr. Jones, (206) 455-8300.

Executive Resources, Inc.
310 188th Ave. NE
Bellevue, WA 98004
employer retained only

Marketing Managers... Product Managers... Sales Engineers...

Who have had successful track records end ere ready for greeter challenges end rewerds.

Advertising space sales end marketing counseling at Hayden Publishing can offer you those challenges end rewards. A career filled with challenges — e new end different one with each of hundreds of clients — one in which the personal and monetary rewards ere high — it's not just a job — it demands e highly self-motivated individual with e strong desire for personal recognition who's willing to use every ounce of energy, experience and education — ere you ready for this career?

If you ere ready, Hayden Publishing's Electronic Design, Computer Decisions, end MicroWaves ere expending end want the brightest end the best territories throughout the country. Ideal candidates would have demonstrable sales end marketing successes and engineering end business management education.

Send resume with salery history to
Victoria Daley, Personnel Manager

Hayden Publishing Co., Inc.

50 Essex St. Rochelle Park, N.J. 07662

An equal opportunity employer. M/F

WANTED
NETWORK COORDINATOR

Must have voice and message switching background, and good written communications. Voice to Oata a plus. Salary 27K

Data Base Analyst

DOS/Total experience or OS/IMS environment. Good opportunity for data base management. Salary 25K

Systems Programmer

Must have OS software experience, assembler language and BS experiance desirable. Salary $22,500.

Programmer/Analyst

To Bal with any type of hardware experience. Many positions available nationwide. Salary 21K. All Expenses paid by company. For immediate consideration call collect

(412) 734-0920

S.A. MORTELL ASSOCIATES
700 California Ave.
Pittsburgh, PA 15202

PROGRAMMER

Rutgers is seeking a programmer to provide advanced reserch applications supoort in the areas of medicine, artificial intelligenca, security of data base, etc., as well as supervising a programming staff.

This position requires a Bachelors degree in computer science or related discipline plus several years programming experience, and a working knowledge of LISP and other common AI languages and systems. Plus some familiarity with DEC TOPS 10, and TOPS 20, or Tanex environment, and the POP 11, and ARPA desirable.

This is a grant funded position with a starting salary of $14,506.

Excellent fringe benefits include 15 days vacation and 15 days sick leave; free hospitalization; and tuition remissions.

Qualified candidates send resumes (Ref #163) to:

Division of Personnel
RUTGERS UNIVERSITY
New Brunswick, New Jersey 08903
Affirmative Action/Equal Opportunity Employer

The EDP Specialist

TRIMBEC INC. (Agency)

Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing Field. Send resume, salary history and geographic preference to the attention of Adele Ourham, Data Processing Division. All inquiries will receive immediate response.

7143 Henry Clay Blvd.
Liverpool, N.Y. 13088
(315) 451-4228
WE KNOW THE PEOPLE
YOU NEED TO KNOW

Systems Programmer

20K to 25K + Bonus
North Carolina

Needed Mini Computer assembler. Honeywall level 6 or 700 preferred. Other mini's will be considered. Will convert from H'well 700 assembler to H'well level 6 assembler. Update message switching system. Some Travel.

Call or Send resume to:
Chip or Loyd

Personnel Placement
537D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-9591

EXECUTIVE DIRECTOR OF THE COMPUTER NETWORK

University of
Nebraska System

The University of Nebraska seeks to fill a major administrative position at the University-wide System level. Tha Executive Director of the Computar Network is responsible for the entire ranga of computer activities in the University of Nebraska. Instructional, research and administrative computing services are provided by the Computer Network. Tha Executiva Director should have experience in managing a large computer service organization, preferably in a major university. Familiarity with modern computing equipmant and networking is essential. For further information, including a position description, contact William C. Erskine, Executive Vice President for Administration, University of Nebraska, 3835 Holdrege, Lincoln, Nebraska 68583.

Inquiries will be responded to until April 20, 1978.

The University of Nebraska is an equal opportunity employer. Minorities, women, and the handicapped are invited to apply.

ANALYST/PROGRAMMER

To work in designing and developing on-line applications in a Burroughs 4700 Madium Systems environment. COBOL experience is required. Experience in any of the following areas is desirable:

- Burroughs FORTE/2 Data Base System Software
- Burroughs Medium System NDL
- Financial and/or Student Accounting Systems for an educational institution.

Send resume, salary history, and salary requirements by April 21, 1978 to:

Kenneth P. Van Kammen
Data Processing Manager
Gateway Technical Institute
3520 - 30th Avenue
Kenosha, Wisconsin 53141

Gateway Technical Institute is an Equal Opportunity Employer/Program.

FLORIDA
SYSTEMS ANALYST

The St. Johns River Water Management Oistrict is seeking an individual with e background in both the Water Resource and Environmental Science field. Preferebly the epplicant should have a degree in Math and/or Computer Science and experience in a Minicomputer environment using FORTRAN language. Statistics & a familiarity with Stat Packages a plus. Oata Base Development experience helpful. Presently interviewing for immediate employment.

Send resume to:

P.O. Box 898
Palatka, Fla. 32077
ATT: Personnel Director
An Equal Opportunity Employer

ASSISTANT TO DATA PROCESSING MANAGER

Opening in San Francisco Bay Area, heavy manufacturing company.

Be a second in command of a department employing 15, using latest IBM DOS hardware and software.

Job will lead to manager of the department within a reasonable training period.

Please send resume and salery requirements to:

291 Albert Drive
Los Gatos, Calif. 95030
An Equal Opportunity Employer

Marketing Representative

Bank DP Services

A major nation-wide financial service organization seeks an experienced sales representative to market Data Processing services to commercial banks. Based in San Francisco, your territory will initially include - Northern California with the opportunity to aggresively expend services into the Pacific Northwest and other Western states.

Requirements include e knowledge of banking, bank operations and industry trends, as well as the ability to operate independently and communicate effectively with all levels of bank management. Previous experience marketing either bank Data Processing services or equipment is preferred.

This highly visible position offers an excellent potential to grow with e young, progressive organization. Please submit your resume or letter, including earnings requirement, to:

CW Box No. 1517
797 Washington St.
Newton, MA. 02160

SOUTH FLORIDA PROGRAMMING OPPORTUNITIES

Racal-Milgo, Inc., a worldwide manufacturer of data communication equipment, has immediate openings for programmers with a minimum of 2 years real tima assembly language experience with mini or micro processors. Communications, teleprocessing, remote batch IBM 3270/2260, Uniscope 100/200/400, VIP 7700 exposure helpful.

We're looking for qualified development and anhancemant people to compliment our small staff of dedicated programmers. We are heavily involved in tha development of naw softwara for data entry, message processing and othar real tima applications of CRT terminals.

Product Manager

Successful applicant should have 3-5 yaars managing product davalopment of SMART terminals. Software background desirable.

We offer excellant salary, complate company benafits, liberal relocation policy and an opportunity to join a group of highly creative people in sunny S. Florida. Wa invita your inquirias concerning a future with us. Send your rasume in complate confidance to Laura Jack, Employment Manager, or call collect (305) 591-5215.

Racal-Milgo —the new name for ICC

8600 N.W. 41st St., Miami, FL 33166 (305) 592-8600

Equal Opportunity Employer

RACAL
The Electronics Group

D P PROFESSIONALS

Our client Companies, include Consulting Firms, Manufacturers, Banks, insurence companies, Oil & Gas companies and Software Houses. They offer career advancement opportunities, strong benefit packages, company-paid moving and interview expense end, of course, they pay our fee. We have numerous openings in the Southwest, Southeast, West and Northwest part of the U.S. for the Professional Programmer/Analyst with 1-6 years experiance, Project Leaders, System Software Programmers, end Managers.

DUNHILL EMPLOYMENT AGENCY OF FORR WORTH, INC.
901 Ridglea Bank Bldg., Fort Worth TX 76116

If you don't have e resume, call us. We'll help you write one.

(817) 732-8191

SYSTEMS ANALYST
DENVER, COLORADO
Salary up to $23,280

Challenging position working with Hewlett Packard 2100/3000 equipment using FORTRAN.

Requires degree and two years' professional (state-of-the-art) systems analysis experience plus at least one year of programming business or statistical application for above equipment using fortran.

Send detailed resume by April 14, 1978 to Career Service Authority, 414 - 14th St., Denver, CO 80202 Attn: Marie Stone.

An Equal Opportunity Employer

MANUFACTURING APPLICATIONS DEVELOPMENT

We're looking for manufacturing application specialists with all levels of knowledge and experience who are interested in joining a progressive, dynamic organization developing business systems for sale to our customers and use in our plants. The system is a complete business system for the discrete manufacturing firm and includes such subsystem areas as Bill of Material, Inventory Control, Material Requirements Planning, Work-in-Process, Purchasing, Master Scheduling, Capacity Planning, and Order Entry.

The system is being implemented for use on NCR's latest generation of large mainframe processors, the Criterion. The system also utilizes transaction processing software to facilitate on-line interactive communication to terminals. NCR - TOTAL is the data base management system. All programs are written in COBOL.

If this sounds like something you would like to be involved with, and you have at least a bachelor's degree, 2 or more years of comparable experience, know and have used COBOL, and have experience with large systems, we would like to invite you to come to Dayton for a personal interview.

For immediate consideration, please send your resume including salary history to:

NCR

Department VM
Corporate Executive &
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

DATA BASE ADMINISTRATOR

City and County of Denver, Colorado

Join a dynamic data services organization in establishing a City/County data base system. Excellent opportunity for individual with hands on experience in data base administration, definition, design, implementation and maintenance. Exposure to multiple data bases desirable. Working knowledge of Data Dictionary software products desirable. Ability to communicate effectively with all levels of City/County management and in user environments is essential.

Salary is in the twenties depending on qualifications. Excellent fringe benefits. Best qualified to be invited to Denver for oral exam.

Experienced PROGRAMMERS also needed.

Send detailed resume by MAY 12, 1978 to Career Service Authority, 414 - 14th St., Denver, CO 80202 - Attn: Sinclair Hugh.

An Equal Opportunity Employer

SYSTEMS ANALYST

Burroughs 6700 - COBOL - DMS II

Gifford-Hill & Company, Inc., a NYSE company, seeks a Systems Analyst for the Corporate Office in Dallas, Texas.

Position requires three years experience with Burroughs large systems and data base application experience utilizing DMS II and COBOL on business applications. Prefer candidate degreed in business, accounting or computer science.

Excellent professional and personal growth opportunity. Forward resume and salary history in confidence to:

Gifford-Hill & Company, Inc.
P.O. Box 47127, Dallas, TX 75247
Equal Opportunity Employer

DATA PROCESSING PROFESSIONALS

Where in the world will you go?

Opportunities for Hardware/Software professionals are worldwide. Your experience in scientific or business environments can open the door to new and exciting projects in a variety of locations. For example:

SUNBELT
Variety of scientific & business applications. Jr. to Sr. levels. 14-26K

HAWAII
Telecommunications-Staff Engineer. Digital Switching Systems. 30-33K

ALASKA
Sr. Software Architect experience in strategic or surveillance radar. 35-37K

BAHAMAS
Scientific, real-time programmers/analysts with FORTRAN and/or Assembly. Salary and unusual benefits negotiable.

CALIFORNIA
State of the art design opportunities at all levels. 15-25K

NEW HAMPSHIRE
Choice positions. Scientific or business areas. Minis & Micros. Strong Assembler. 16-28K

It's your move now.

PREFERRED POSITIONS

PROFESSIONAL PERSONNEL CONSULTANTS
142 Main Street Nashua, N.H. 03060
CALL COLLECT (603) 889-0112
Our clients are equal opportunity employers and assume all fees.

computer hardware and software candidates

RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

BRENTWOOD PERSONNEL ASSOCIATES
Computer Division
1280 Route 46
Parsippany, N.J. 07054
(201) 335-8700

D. BROWN & ASSOCIATES
Dorothy Spiegel
DP Specialist
610 S.W. Alder, Suite 711
Portland, Ore. 97205
(503) 224-6960

SUPERIOR RESOURCES
15409 Venture Blvd.
Encino (L.A.), Calif. 91436
(213) 986-4400

COMPUTER CAREERS INC.
Specialists
Data Processing
4720 Montgomery Lane, #503
Bethesda, Md. 20014
(301) 654-9225

members of
National Personnel Associates
Specializing in DP

PROGRAMMERS SYSTEMS ANALYSTS PROJECT LEADERS

Requires BA/BS in Math, Engineering or Physics with some Statistics. Opportunity for individuals with five years programming experience including Petroleum or related industry, FORTRAN, COBOL, IBM 360/370 and CDC 6000/7000. Other openings for same experience levels on Honeywell H6000 series.

Send resume with education, qualifications and experience to:

Dynalectron Corp.
6801 Calmont
Ft. Worth, TX 76116
Attn: DPS

ARIZONA SOFTWARE MANAGER

Applied Data Systems is a Phoenix based software company serving the automotive industry nationally. We need an outstanding self-motivating systems & software manager. Experience managing a large software group is required. Excellent growth opportunity. Initial Sal to 30K based on experience. Send confidential resume with salary history to: Ads/Mgr., P.O. Box 2056, Scottsdale, AZ 85252

PROGRAMMING PROJECT MANAGER

Extensive application programming including systems design. Prior supervision of technical staff no less than five persons with multiple application responsibility. Must understand various random file access methods and structures. Direct involvement with user departments in an on-line environment involving a large data base. Programming in Cobol using Burroughs medium systems useful. Headquartered in Connecticut, Fairfield County. Please send detail resume to CW Box 1520, 797 Washington St., Newton, Ma. 02160.

EDP AUDITOR

International finance giant with a regional office in California. Exposure to financial service industry to do EDP audits for West Coast branches. Opportunity to join a prestigious organization. $25,000 FEE PAID

ROBERT HALF
PERSONNEL AGENCIES, INC.
522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

Share Yourself...Teach

Just another cliché or a career opportunity?

Our success and growth have resulted in an exceptional career opportunity for you if you've been honing your MVS or JES3 skills by doing, and now desire to take the next step in the "learn-do-teach" cycle. Join the growing software instruction team at Amdahl and learn why so many people say that teaching is the most fun they've had in their DP careers.

SOFTWARE INSTRUCTORS

We currently have openings at our Sunnyvale, California headquarters for qualified professionals ready to take that next step. We invite you to send your resume in confidence to Phil Beckhelm, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. If you're not quite ready or need more information, please call Charlie Wareing, 408/735-4326 (collect), in our Software Education Department. He'll be happy to talk with you. We are an equal opportunity employer.

amdahl

Programmer Analysts

Become Involved in digital PDP-11 minicomputers

We are a medium size rapidly expanding financial institution seeking EDP specialists as permanent additions to our expanding EDP Dept. These positions are permanent assignments in our corporate headquarters based in New York City.

Qualified applicants should possess 2-5 years experience in a PDP-11 environment and have strong skills in RSTS/E coupled with BASIC PLUS. Must be able to interface with line management in major systems designs, write systems specs, documentation, testing and troubleshooting. A banking background is a definite plus.

We offer a starting salary in the mid twenties, outstanding benefits as well as financial and professional recognition.

Please submit a detailed resume complete with salary history and requirements in confidence to: PERSONNEL OFFICER, PROFESSIONAL RECRUITING DEPARTMENT

REPUBLIC NATIONAL BANK OF N.Y.
452 Fifth Avenue, New York, N.Y 10015
An Equal Opportunity Employer (M/F)

JOB OPPORTUNITIES IN DATA BASE ADMINISTRATION

(including Manager position)

If you are interested in Data Base Administration, please send your resume with current salary to:

CW Box 1521
797 Washington St.
Newton, Mass. 02160
EOE M/F

FLORIDA

Offers more than just sunny weather and sandy beaches - it also offers opportunity. Right now, for example, Chloride Incorporated, a progressive international corporation, seeks quality personnel-analyst programmers - to work with an IBM 370 and a diversified tele-processing network. Applicants should be skilled in DOS/VS, CICS, COBOL, VSAM, and POWER/VS. Experience in manufacturing and general accounting systems desirable. If you possess such qualifications, why not earn an excellent salary and numerous fringe benefits while enjoying America's vacation land year round. Send resume in confidence to:

D.P. Manager
P.O. Box 24598
Tampa, FL 33623

Technical Support Manager

370-148 DOS/VS-VM Environment

Milwaukee based company is seeking an experienced professional to establish a new technical support unit for our rapidly growing data processing department. This position offers a unique opportunity to work with top management in determining the future direction of our data processing equipment. The individual selected should be familiar with remote job entry, on-line teleprocessing, time sharing, hardware evaluation and development of data processing standards.

In return for your skills, we are providing an excellent starting salary plus a fringe benefit package which includes company profit sharing.

For confidential consideration, forward a brief resume of experience, to:

Mr. Howard Grigg
NORTHWESTERN NATIONAL
INSURANCE GROUP
A subsidiary of NN Corporation
731 N. Jackson Street Milwaukee, WI 53201
an equal opportunity employer m/f

VIRGINIA /MARYLAND OPPORTUNITIES

MIS MANAGER — To $24,000
Industrial environment, design exp, 360/370 environ, COBOL. Start Sr. Analyst - MIS mgr. within 2 yrs. EEO employer.

MINI'S — To $25,000
Scientific and/or Software programmers. Fortran, Assembly, basic; Mini's esp. PDP-11. Major Co's.

EDP AUDIT
Several openings. Audit thru computer. Financial systems, set standards, security etc.

SYSTEMS ANALYSTS (9) — To $23,000
Senior or project leader level, industrial/commercial exp. order entry, inv., etc. 370, OS, telecom environ.

PROGRAMMER/ANALYSTS (3) — To $22,000
Degree, 3+ yrs. exp. COBOL, large Scale IBM. Both financial and Mfg. applications.

PROGRAMMERS — To $18,000
Both junior and senior positions available. Req COBOL, ALC.

Client companies pay all employment expenses. For details on these and other career opptys. in Maryland, Virginia and DC suburbs, contact Geo. Nugent, Mgr. D.P. Placement.

FOX-MORRIS PERSONNEL CONSULTANTS
409 Washington Ave. Baltimore, MD 21204
4921 Jones Branch Drive McLean, VA 22101

POSITIONS NATIONWIDE

CALL TOLL FREE
800-426-0342

DATA BASE ADMIN — To 25K
Design DB for Bill of Matl., Routings, Item MST. DMS II, Total, IDMS or IMS Exp.

SYSTEMS PROG — To 30K
Need IBM, H6000, PDP/11 and CDC Backgrounds With 2 Years Experience.

IMS PROGS — To 29K
Insurance, Banking & Mfging. Background Req.

PROJECT LEADERS — To 28K
Degree Required, With Mfg. Background.

APPLICATIONS PROGS — To 24K
Several Openings.

BILL ISGRIG
PARKER PAGE ASSOC
P.O. Box 12308
Seattle, WA 98111
Offices in Wash., D.C.,
Chicago, Atlanta, Portland, Or.

COMPUTER SALES SYSTEMS ANALYSTS PROGRAMMERS FIELD SERVICE

We currently represent leading firms with openings throughout the U.S. You must have 2-4 yrs of successful related experience. Total compensation packages range from 15K to 30K. Call Bill Coyne (617) 235-4670 or send resume to:

SPI Personnel Consultants
95 William St.
Wellesley, MA 02181

Administrative Computer Applications

Coordinate development and maintenance of computer services for the administrative functions of a private liberal arts college on a PDP-11/70. Some hardware and systems maintenance; opportunity to teach. Qualifications should include familiarity with college computing applications and RSTS. Salary competitive; an equal opportunity employer. Send credentials to David D. Dexter, Director of Computer Services, Alma College, Alma, MI 48801.

COLORADO!

COMMUNICATIONS SPECIALISTS
Handshake-level software development. Current clearance required.

SOFTWARE RESEARCH
Advanced hardware/software architectures--MS/PhD EE.

DYNAMICISTS
Structural Dynamics, finite element analysis.

PROGRAMMER/ANALYSTS
IBM OS PL/1 or COBOL, prefer IMS experience.

For confidential consideration, please send resume to attention of Mr. Pieper. NELSON, COULSON & ASSOC., INC., Consulting Engineers, Suite 507, 333 W. Hampden Ave., Englewood, CO. 80110. EOE M/F.

RENO-NEVADA PROGRAMMER/ANALYST

Are you looking for a good position in a community of 150,000 with a clean environment and excellent summer and winter recreational opportunities?

We are looking for career minded professionals with the following qualifications:

- 3+ years Analysis and Design.
- Heavy COBOL Experience
- Proficient at IBM OS JCL
- Burroughs Experience a Plus

If interested send your resume and salary history to:
Western Bancorp, Data Processing Company, Post Office Box 11007, Reno, Nevada 98520, Attn: John Brinnand or Ron Ethridge (702) 329-6414 *Equal Opportunity Employer*

SYSTEMS ANALYST

SENIOR

Capable of analysis, design and implementation of complete system, such as police library and accounting. On-line facility uses powerful new language to solve data management problems. Need orderly, rapid learner to lead technical development of integrated systems. Requires recent track record of successful systems designs. Preferred degree in business administration and 1 year accounting and 2 years systems analysis and programming experience or a satisfactory combination of training and experience. Send resume and salary history by April 17, to:

Personnel Dept.
City of New Rochelle
515 North Ave.
New Rochelle, N.Y. 10801

We are proud to be an Equal Opportunity/Affirmative Action Employer

---

SOFTWARE SYSTEMS ARCHITECT

Palyn Associates, a consulting firm in San Jose, California that specializes in computer systems architecture, is seeking a software systems specialist for our architectural team. Candidates should have a Ph.D. in either Computer Engineering or Computer Science, or evidence of significant contributions in software engineering. Preference will be given to applicants having experience with operating systems and data communications, particularly on IBM System/370 and/or HIS Level 66.

Palyn's clients include domestic and international main frame manufacturers and communications utilities. You can expect to contribute to both the advancement of your discipline and the development of real products. Palyn offers a generous compensation and benefits package and the opportunity for international travel. Please direct your response to Dr. George E. Rossman, Palyn Associates, 4100 Moorpark Avenue, Suite 201, San Jose, CA 95117.

Information System Coordination

Portland State University
Portland, Oregon

Responsible for coordination of comprehensive Student Information System (uses COBOL on HIS 60/40 system) and technical assistance to users. Qualifications include Bachelor's degree and min. 2 yrs. experience in development, implementation, coordination of information systems. Previous COBOL programming experience highly desirable. Salary: $18-20,000 depending on educ. and info. system experience. Application deadline: April 21, 1978. Position to be filled by May 15th. Forward resume and 3 letters of recommendation to:

SIS Search
Office of Institutional Research
Portland State University
P.O. Box 751
Portland, OR 97207

PSU is an Equal Opportunity/Affirmative Action employer. All interested persons are encouraged to apply.

CINCINNATI

Software Mgr - Mini	32K
EDP Auditors	25K
Sys Manager	24K
IMS Data Base	25K
Systems Anal	24K
Prog. Anal on-line	24K
Prog. Anal. mini	23K
Prog. Anal - all lang	14-23K

Fee & Relocation Paid
Call Bill Riethmiller
(513) 861-5575
eve/wknds (513) 561-8838
or send resume to:
Angus/Baldwin Assoc., Inc.
2337 Victory Pkwy.
Cincinnati, Ohio 45206
Nationwide Coverage
80 affiliate offices

DATA BASE ADMINISTRATOR

$1,926 - $2,340

(5 Steps) Placement on salary schedule determined by qualif. and experience. BS plus 4 yrs. exper. in systems analysis; one yr. on-line data base systems design experience. Apply Alameda County Office of Education, 224 West Winton Ave., Rm 135, Hayward, CA 94544 (415) 881-6203 by April 13, 1978. EOE.

TEACHING POSITIONS

One or more faculty positions at the rank of instructor, assistant professor, or associate professor may become available in a growing Department of Information Science beginning September 1, 1978. Salary and rank will be commensurate with background and experience.

A Master's degree in Computer Science or related area is the minimum education requirement. Candidates should be able and willing to teach elementary courses in Data Processing, such as the common data processing languages (eg, COBOL, PL/I, IBM 360/370 Assembler, RPG, FORTRAN, or BASIC) and more advanced courses in several other areas such as compiler theory, systems programming, data base structure and design, information systems design, operating systems theory, microprocessing, teleprocessing, or data communications and be able to make substantial contributions toward the development of the graduate program. Letters of application, accompanied by detailed resumes, should be received by April 20, 1978 by

Dr. Donald LaBudde
Department of
Information Science
Northeastern Illinois
University
5500 North St.
Louis Avenue
Chicago, Illinois 60625

An Equal Opportunity Affirmative Action Employer

SPECIALISTS

Disk Packs Data Modules

Bought - Sold - Traded

Contact
Rick Hubata, Sales Director
Systems Supply Corp.
833 W. Jackson Blvd.
Chicago, IL 60607
(312) 421-2900

IBM 360-40-128K

(4) 2401MOD-6
(4) 2314
(1) 2540
(1) 1403-N1

- DOS Environment
- Forms Handling Equipment
- Keypunch Service Available
- Rates from $30.00 an hour
- All Shifts-Weekend too!

Contact: Claude Hill
(214) 661-8790
5744 LBJ Freeway
(Across from Valley View Shopping Center)
Dallas, TX 75240

DEC HARDWARE

PDP 11 PDP 8

Processors Peripherals Memories

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

FOR SALE

2 IBM 360/65
Model J's

Each has 2860-03 selector channel and 2 meg of core. One has 1052-01

Available in May and June.
End users only please

American Airlines
John Anderson
(918) 836-5511 Ext. 3170

Marty Welsh
(212) 557-1234 Ext. 5137

IBM 370/158 Attached Processor System

AVAILABLE JULY, 1978

Contact: Jerry Borisy
JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228
(303) 988-0820

FOR LEASE IBM SYSTEM/32

Model B33
avail Apr '78
2,3 or 5 yrs
LeMans Corporation
Mpls (612)854-8380
Chic. (312)896-5060

Wanted

IBM 2956 or 1419

CW Box 1516
797 Washington St.
Newton, MA 02160

OWNER RETIRED - LIKE NEW WANG MINI COMPUTER TO BE SOLD FOR BEST OFFER. CONFIGURATION:

2200T-6 Processor (24K Bytes) 6 I/O Slots; 2226A 12" CRT (64 X 16) Keyboard Console with Controller for CRT, Printer and Diskette; 2231 W-Z Line Printer (132 Col/120CPS); 2260B1/4 2.5 MB F/R Disk Drive with Controller; 2270-1 .25 MB Single Removable Diskette Drive. MAIL INQUIRIES AND BIDS FOR TOTAL SYSTEM OR ANY COMPONENT TO:

)LP COMPUTER
8508 Westfield Blvd.
Indianapolis, IN 46220

For Sale

Burroughs B700 system

160 LPM Printer
4.6 MB Disk
32.K Memory

Contact:
CW Box 1518
797 Washington St.
Newton, MA. 02160

ONE OR TWO YEAR OPERATING LEASE

3333 - II

3330 - II

404-455-9037

WANTED TO BUY

370/155 ANY CONFIGURATION

DAT ORDER POSITION FOR 155

COMPUTER INSTALLATIONS CORPORATION
5514 Caroline Street
Houston, Texas 77004
713-524-8249

FOR SALE OR LEASE
Available Now
370/155 MEMORY
2½ MEGABYTES

Please Contact:
Harry Blair
or
Richard Johnson

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540,
3803, 3420, 3340's

IBM UNIT RECORD
EQUIPMENT

026, 082, 083, 084, 085, 087, 088,
402, 407, 514, 519, 548, 552, 557,

029-059-129

Call us for all your needs; we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. Contact ACS for proposal.

ACS
7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910-881 1526

EQUIPMENT CORP.

360/20

All Models
Up grades
Features
Immediate
Delivery
Extraordinary
Savings
Special
Purchase/Lease
Plans Available

Call Marie Bednarz
(313) 642-8000

CMI
The IBM Specialists
CORPORATION
1500 N Woodward Ave
Birmingham Mich 48011 (313) 642-8000

★

NEW DG NOVA 3/12's

WITH BATTERY BACKUP AND
AUTO PROGRAM LOAD
AND RESTART
NEW DG MEMORY
32 OR 16 KB

IMMEDIATE DELIVERY WITH
22% DISCOUNT

CALL CLARK & ASSOC.
(816) 741-3183

Why Comdisco is First in the Second Market:

IBM Processors available

135/145
145s needed
135s available
for lease

155
Immediate
delivery with
DAT

158
want to
buy or
lease

165
Available
for sale
or lease

IBM Peripherals available

3420
We will purchase
your 1600 BPI
drives and replace
with Models 4 or 6
immediately

3330/33
All models
available for
delivery now.

3340/44
Wanted to
buy

SPECIAL
3420 models 4 & 6
available now.
3830-2 Control
Units-Now

IBM 3031, 3032, 3033 operating leases available.

Atlanta 404/256-5956
Fort Worth 817/534-1774
Minneapolis 612/854-8107

COMDISCO®

New York 201/568-9666
San Francisco 415/944-1111
Paris, France 374-1130

9701 W. Higgins Rd., Rosemont, Ill. 60018 (312) 698-3000

Your First Choice in the Second Market

FOR SALE OR LEASE

- 3277-2 Display Stations. Many available for immediate delivery.
- 3340-B2 Disk Storage Drive. Two available for immediate delivery.
- System/32 Many configurations available for immediate delivery including A-32, B-33, B-34, C-44. Other configurations available.
- 1403-2 or N-1 Printer and 5421-1 printer control unit.

WE WANT TO BUY

SYSTEM/3 Model 15. Any configuration. Rental Credit machines OK. Highest prices and commissions paid.

We also need:

- Several System/3 Model 10's and System/32's.
- 3340, 3411, 3410, 3741, 3742, 3277, 3271, 3272, 5421, 1403, 5496, 9610.

data3

computer corporation 114 central avenue, box 256, buffalo, minn. 55313 (612) 582-4554

WANTED TO PURCHASE

6-3420-3's 6631 or 3550 - ASAP
1-3803-1 3551 ASAP

FOR SALE

1-3411-3 3221, 7360
1-3410-3 3221

AVAILABLE FOR OPERATING LEASE

12-3420-6's incl. 6425, avail. 4-1-78
2-3803-2's incl. 8100 & 1792, avail. 4-1-78

CALL: (203) 324-9495

STAMFORD COMPUTER GROUP, INC.

927 Westover Road
Stamford, Connecticut 06902

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115 370/125

ECONOCOM

ECONOCOM
1255 LYNNFIELD ROAD
P O BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

DEC PROCESSORS

PERIPHERALS & MODULES

BUY - SELL - LEASE - RENT

$1,000,000

NEW & USED DEC INVENTORY

—DEC CPU'S
—DEC DISKS & CONTROLLERS
—DEC TAPES
—DEC TERMINALS
—DEC PERIPHERALS
—MISC. BOARDS & MEMORY

Hundreds of Misc. Modules & Cables Available
Call for other components in stock

SAVE 33%
NEW 11T34 CONFIGURATION
$23,333.33

For fast delivery and substantial $aving$
CALL the DATALEASE Digital HOTLINE

800-854-0359

DATALEASE

700 No. Valley St., Ste. A, Anaheim, California 92801
(714) 533-3920 Telex 692439

FOR LEASE-FROM LESSEE

370/168-U36 avail. June 1978
3855, 4525, 4560, 2150, 2151, 6111,
3066-II, 3067, 2860-3, 2870-1, 2880-2(2)

Will lease for 2, 3, or 4 years
Contact: Mr. Frederick D. Lehmann

MARTIN MARIETTA DATA SYSTEMS

P.O. Box 5837, MP-263
Orlando, Florida 32855
(305) 855-1050. Ext. 7410

Attached Processor AVAILABLE Jan 1, 1979

Contact: Jerry Borisy

JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, CO 80228
(303) 988-0820

303X Leasing

Large industrial corporation wishes to purchase and lease back to substantial corporations IBM 303X Systems. We will only deal with end users and equipment must be scheduled for delivery in 1978.

CW Box 1410
797 Washington St.
Newton, Mass. 02160

LIQUID COOLED MAIN FRAME USERS

We have a cooling unit for liquid cooled CPU's that operates up to 50% cheaper than other available units. Saves installation time and money. Does not take up space in computer room. Comes complete with 100% back-up system.

CONTROLLED ENVIRONMENT CORP.

640 Raynolds
Kansas City, KS 66101
(913) 342-3599

Over ten years experience in computer room environments. Ask about a heat recovery system for your EDP site. Could save you a small fortune in utilities.

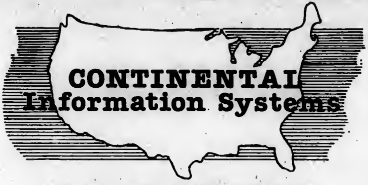
FOR SALE OR LEASE

IBM 3277-2's with
4630 Keyboards
30 Day Delivery
Call Collect or Write

Berlent Industries, Inc.

1975 Hempstead Tpk.
East Meadow, N.Y. 11554
(516) 794-9722

Member Computer Dealers Association



CONTINENTAL Information Systems

BUY, SELL, LEASE, SUBLEASE, AND TRADE

NEW AND PRE-OWNED IBM EQUIPMENT

AVAILABLE

Mar 78
165-II
168 memory, pre-owned
188 1435 buffer expansion
2860-2
2870-1
2880-2

Apr 78
135
145
155-II
158 pre-owned
165-II
158 AP, ITC qualified
168
158-3 upgrade
2880-2
3271's, 72's, & 77's

May 78
135
158, pre-owned
168, pre-owned
3360-5 (4)
2 MB 158 INTEL
2860-2

Jun 78
158, pre-owned
2880-2
158

We will also take your currently installed IBM equipment in trade on a new system.

Peripherals and I/O

All 360/370 Disk, Tape
Printers, Readers, and T/P

Gene Chappell
Wanted:
3330's, 3340's & 3420's

Call Us!

CIS

CIS Corp.
600 MONY Plaza
Syracuse, NY 13202

315-425-1900

CIS is very interested in buying pre-owned IBM 370 systems. If you are thinking about selling, let us make you an offer.

MINICOMPUTERS & SYSTEMS

Don't waste company time or money. Check with us before you buy or sell.

**New DEC Equipment
Immediate Delivery**

RK11-RK05 Disk Systems - $6500
PDP 11/04s and 11/34s - 20% off list
DZ 11
DEC Station 78

**New DG Equipment
Immediate Delivery**

DG 10 Mbyte Disk Systems from $7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list

Immediate delivery for MOS!

Inventory Clearance
call us for free brochure

MINICOMPUTER EXCHANGE

(408) 733-4400
TWX 910-339-9272

IBM 370 CPU Features Available for Sale Immediately

3135
4655, 4670, 4672
8637, 6982
3145

Model Changes

GE0 H0 H2 to 12
2150 2152 6111

Many Other
Features Available
For Most 370 CPUs
Power Conversions
50 or 60 Cycle

CIRCLE COMPUTER SERVICES

920 Remington Road
Schaumburg, Ill. 60195
(312) 884-2424

FOR SALE

IBM Model 158 Memory

K to KJ or U34 to U35
Available May
Call Anne Rhame
Commonwealth
Computer Advisers, Inc.
707 East Main Street
Richmond, Virginia 23219
(804) 643-4200

SALE OR LEASE

1419

3410-2 Tape

Immediate Delivery

Contact Bernie Gest
215-635-1700

Computer Marketing Inc.

7704 Seminole Ave
Melrose Park, Pa
19126

Member Computer Dealers Assoc

Sale or Lease

135/I (512K) Serial No. 61154	138J (1 Meg) Serial No. 61271
145/I (512K) Serial No. 10873	Most 370 Peripherals Other 370 Systems

- Available Now
- Flexible Leases
- Configured To Your Needs

"Professionalism"

Please call Mary Bergen
(800) 225-2036 or (617) 482-4671

Computer Systems of America, Inc.

141 MILK ST. BOSTON, MA 02109
Tel: (617) 482 4671 or 1 (800) 225 2036

ISI

INDEPENDENT

WE BUY - SELL - INSTALL & REPAIR

AT REASONABLE PRICES

**HONEYWELL USED
SERIES 200 EQUIPMENT**
COMPUTER SYSTEMS
PARTS — PERIPHERALS

Now in stock

2040 64K M7 32K M9
120-1250 , TAPE DRIVES
READERS PRINTERS PUNCHES
3200-131K Avail. 6/78

CALL NOW
Wilson Grabill (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati Ohio 45246

BUY SELL LEASE

SYSTEM/3

Models 15, 10, 8, 6
Systems 32 & 34
All Support Peripherals

COMPUTER BROKERS, INC.

P.O. BOX 28298
Memphis, Tn. 38128
Phone 901/372-2622
Member CDA

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Bldg., Jackson, MS 39201, for the following data processing equipment and services:

Request for Proposal NO. 350 due 2:00 p.m., April 14, 1978, for the purchase of two microprocessors compatible with existing software written for the Altair 8800B microprocessor

Request for Proposal No. 351 due 2:00 p.m., May 1, 1978, for the acquisition of a computer system capable of multi-programming and high-level programming languages, to be used in a small university environment; and, for the sale of an existing IBM System 3/10 computer system

Request for Proposal Number 352 due 2:00 p.m., May 1, 1978, for the acquisition of a software product to allow an IBM MVS operating system installation to monitor selected areas of system activity and obtain feedback in the form of SMF records and/or analytical reports

Request for Proposal No. 353 due 2:00 p.m., May 1, 1978, for the acquisition of a small computer system compatible with existing software written in the DATABUS programming language, or a method of converting to another programming language

Detailed specifications may be obtained from the CDPA office. the CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Frank C. Stebbins, Executive Director
Central Data Processing Authority

PDP 11/60 MASS STORAGE, MULTI-USER SYSTEM

Description

PDP 11/60 with MOS memory (battery back-up), Console Terminal, CRT Terminal, Double width cabinets, DH-11's with 32 async lines with modem control, dual 300 Mbyte drives, RK05 development drives, 300 LPM matrix Printer/Plotter, DEC RSX-11M with Fortran 4 plus full service software license.

Service

FORMED can provide complete installation including: site planning, installation of hardware/software systems.

FORMED provides complete pre-delivery checkout of critical system components.

FORMED account representatives are hardware/software scientists.

**CALL TODAY FOR IMMEDIATE SERVICE
(213) 477-7534**

Before you buy or sell used computer equipment consult

COMPUTER PRICE GUIDE

"The Blue Book of Used Computers"

Quarterly publication contains current price information about used IBM computers and peripherals. Includes newsletter about current price trends and availabilities.

$5 per issue — $18 annual subscription

Computer Merchants Inc
75 South Greeley Avenue Chappaqua New York 10514
Member Computer Dealers Association (914) 238 9631

SALE

ALL IBM Unit Record Equipment

129 & 029's

East Coast
(717) 564-8870
West Coast
(415) 332-6265

dpa Unit Record Leasing Company
110 HiVista Road
Sausalito, Calif.

LEASE

FOR SALE

PDP11

IMMEDIATE DELIVERY

Datasystem 354

Includes:

PDP11/34, 64K, 2-RK05 Disk Drives, 1-VT52 terminal, 1-LA36 terminal, 1-LA180 Printer
Including full accounting applications software.

Also immediately available:

- PR11 High Speed paper-tape reader
- PDP11/03-KA with 16K and power supply

Spiridellis & Assoc., Inc.
14 W. 40th St.
New York, N.Y. 10018
(212) 221-7270

CMI BUY LINES

BUY-SELL-LEASE-TRADE

Call (313) 642-8000

3031/3032/3033
(Lease Only)
Marilyn Burchl

370/165 370/168
Bob Van Hellemont

370/158
Ron Baker

370/155
Gary Smith

370 148/145/138/135
Pam Hoban

370/115/125
Bob Southwell

3420 3803
3333 3830
3330 3340
Darryl Hastings

1403 2821
2501 1442
1443
Kathy Housey

BUY OF THE WEEK

370/168 SN 60306
June availability. Will configure to your requirements.
Bob Van Hellemont

370/155J
DAT • 3 Channels
1 Meg IBM • 3215 Console
Available *Now!* $575,000
Gary Smith

135 1
All IBM Memory
IFA, IPA, ICA
Available April.
Pam Hoban

3145, 1024 K OEM Memory
Can reconfigure to meet your specific needs.
Bill Graham

IBM 158 Memory I to KJ
Available April.
Carole Solano

Call (313) 642-8000

360 30/40/50/65
Gary Smith

3270 CRT's
Printers/Controllers
1130
Jim Carleton

System/3
Model 15
Jerry Roberts

3742
3741
5496
Jerry Sharon

360/20
085-083-029-059-026-129
Marie Bednarz

CMI CORPORATION *The IBM Specialists*
Member Computer Dealers Association
1500 N. Woodward Ave., Birmingham, Mich 48011, (313) 642-8000

IN CANADA CALL:

Don DuPuis
Windsor, Ont.
(519) 258-8910

Ron Ridding
Toronto, Ont.
(416) 683-3704

Jacques Dagenais
Montreal, Que.
(514) 374-5920

---

efm computer
leasing, inc.

3000 marcus avenue
lake success, ny 11040
(516) 488-7876

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65
360/50 370/135
370/145

FOR SALE

BURROUGHS-B711

- High Speed Processor
- 32 KBm Core Memory
- 9.2MB Dual Disk Drive
- Console w/Pin Feed
- 160LPM Printer
- 20 Spare Disk Paks
- Disk Storage Cabinet
- Burroughs Maintenance

Contact: Mr. M.J. Meyer
P.O. Box 108
Huntington, In. 46750
(219) 356-5200

WANT TO BY

- IBM 3420/8 Tape Drives
- IBM 3811/3211 Printer
- IBM 3333/3330 DASD
- IBM 3277 CRT's and Controllers
- IBM 370/135 Model I - 512K
- IBM 370/145-512K and 1 Meg.

FOR SALE OR LEASE

- IBM 3420/3 Tape Drives
- IBM 370/138 J - 1 Meg.
- IBM 1403-2 Printer
- IBM 3420/5 Tape Drives

Call

FORSYTHE McARTHUR
(312) 943-3770

Dealer & Lessor in IBM Computers

FORSYTHE McARTHUR ASSOCIATES INC

When you plan to buy or sell your computer equipment...

For complete information call the Greyhound Representative in your area.

WANT TO BUY

370/158 370/155 370/145

US	Home Office	T A Takash	602-248-6037
	New York	Dick Ventola	914-949-1515
	Chicago	Pete Ahern	312-298-3910
	Dallas	M W "Bill" Tucker	214-233-1818
	San Francisco	Henry Paulson	415-283-8980
INTERNATIONAL	Canada	Don Maunder	416-366-1513
	U K /Europe	Joe Gold	022-61-27-54
	Mexico	Andres Contreras	905-543-6850
	Austro-Asia	John Hallmark	214-233-1818
	Eurasia	Don Haworth	214-233-1818
NON IBM	Dallas	John Hallmark	214-233-1818

GO GREYHOUND
Greyhound Computer Corporation
Greyhound Tower Phoenix Arizona 85077

168AP

Available
October '78
Call Marvin S. Haber
Federal Data Corporation
(301) 652-5766
TWX 710-824-0558

370/158

Serial Number 23566
Available May, 1978
Contact: Ann Rhame
Commonwealth Computer Advisers, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219
(804) 643-9123

370/165-II

- FOR SALE OR LEASE
- AVAILABLE JUNE 1978
- AS SHORT AS 24 MONTH LEASE AVAIL

CALL TED MOLINARI AT:
(201) 947-4200

IPS
IPS COMPUTER MARKETING CORP
2460 LeMoine Avenue
Fort Lee N J 07024

AVAILABLE

SYSTEM/34s - 5110s

DATALEASE CORPORATION

IBM GSD LEASING SPECIALISTS

BUY-SELL TRADE

For Computer Action Write

CAC

404 458-4425

P.O. Box 80572
Atlanta Ga 30366

APL TERMINAL FOR SALE

Intertec Model I Spintronic APL Keyset/APL and Ascii Typewheels Impact Printing/30 CPS/Pinfeed Platten $2,950/18 Mos. Old/$4,500 New

Contact: D.A. Brown
Charlotte, N.C.
(704) 377-0801

WANTED FOR HONEYWELL 2200

278-5 or 15
Disk Subsystem
or 278-7 or 17
Disk Subsystem
M7 or M9 Memory
65K or 131K
Must be Eligible for Honeywell Maintenance

Write or Call:
Dick Koehler
Aldrich Chemical Co., Inc.
940 W. St. Paul
Milwaukee, WI 53233
(414) 273-3850

FOR LEASE IBM 370 SYSTEMS

Available June
168-AP 6 MEG
158-3 3 MEG
158-AP 3 MEG

Available September
158-AP 2 MEG

2, 3 and 4 year operating leases

also available October
168-U34

Call or write
Jerry Minsky

Alanthus Leasing Company

111 High Ridge Road
Stamford,
Connecticut 06905
203-348-4820

ECLIPSE C300

– SURPLUS –

20 meg. dual disks, mag tape
300 LPM printer, 8 line communications
4 CRT'S. Full software. 1½ yrs. old

BUY OR LEASE FROM OWNER

PHIL THOMAS (305) 272-8753

Thomas Business Systems, Inc.

---

dc dc

dearborn taketh your surplus IBM equipment and make it disappear or leaseth it back to you

Call Tom Millunchick
(312) 827-9200

or any dearborn office

dc **dearborn** computer company | dealer-IBM computers systems software leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st. louis (314) 727-7277 • houston (713) 965-0788 • dallas (214) 748-5899

---

dataserv

buy • sell • lease • trade

370
115/125/135
Steve Lacny
800-328-2406

For Sale or Lease
Any 115/125 configuration

Sending 115/125
Back to IBM

Call us! We'll show you how to make money using your rental credits

370
138 THROUGH 158
Dave Miller
616-637-8481

For Sale or Lease
138 - 145 - 155 - 158
CPUs — Peripherals — Memory

370/145-IH2

7855
8810
6982
6983
3215 Console
3047 Power Units

370
Peripherals
800-328-2406
Tom Anderson

Avail. Now	WTB	
3271-2	3271	3330/3333
3340-B2	3272	3410/11
3410-3 S.D.	3275	3420
	3277	3340
	3286	3344
		3803
		3830

STOP! Before you send any of the above machines back to IBM call us. We'll show you how to make money.

360
CPUs and Peripherals
Neal Johnson
800-328-2406

	Available Purchase	Lease
360/65I 3860-03 2870-01	$165,000	$4,135

1419 Single & Dual Address
• Lease's Avail.

We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

Sys/3
CPUs and Peripherals
800-328-2406
SYS/32's

SYSTEM/3
5410-5415
SYSTEM/32
ALL MODELS
SYSTEM 34
Delivery Positions

Call Toll Free 800-328-2406
or 612-544-0335

Member Computer Dealers Association

Or write Dataserv Equipment Inc 9901 Wayzata Blvd
P.O. Box 9488 Minneapolis MN 55440

SMI

OPERATING LEASES

16 IBM 3420-4Dual Density
2 IBM 3803-2
Available May 12, 1978
Net 90% IBM FTP
2 Year Basis

Contact
Al Emery

Systems Marketing, Inc
200 E. Thomas Rd
Phoenix, Arizona 85012
(602) 264-5600 Telex 667-334

FOR SALE/LEASE

DEC LSI 11®
PDP 11V03 SYSTEMS
LA 36 DECwriters
LA 180 * VT 52
In Stock For
IMMEDIATE DELIVERY

UNITRONIX CORP
1081 U.S. Hwy 22
P.O. Box 6515
Bridgewater, N.J. 08807
(201) 725-2560

BUY • SELL • LEASE

026	$ 850	085	$ 750
029	1850	088	2500
059	1375	129	3350
082	800	514	800
083	1800	548	1500
084	2500	552	900
		557	2800

MOHAWK-6401-6403 NCR-736

Want to buy IBM 029's, 129's, 3741's, 3742's

COMPLETE LINE BURSTERS, SHREDDERS
DECOLLATORS AND BINDERS
ECONOMICAL LEASE PURCHASE PLANS

DP SERVICE INC.

CALL STAN PELC or NATALIE REYES
312-774-2556
5505 N MENARD AVENUE CHICAGO, ILLINOIS 60630

[illegible]

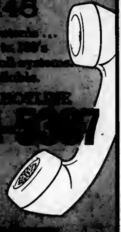
[illegible]

RANDOLPH

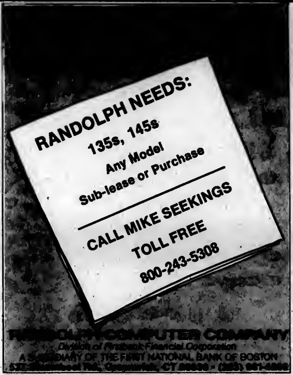
370/138
370/148
370/135
370/145

... and all other IBM systems ... from S/3's and 115's ... to 168's and all 303X CPU's or full systems. Up to 8-year leases available.

CALL THE 370 HOTLINE
800-243-5307



[illegible]



RANDOLPH NEEDS:
135s, 145s
Any Model
Sub-lease or Purchase

CALL MIKE SEEKINGS
TOLL FREE
800-243-5308

RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
[illegible] CT [illegible]

IPS 201-947-4200

"FOR SALE OR LEASE

165K-II
4 megabytes with DAT end channels.

158-K
With ISC eveileble on 2 yeer lease.

155J-II
up to 2 megabytes with e DAT.

148/138
Severel of these machines ere now aveileble from the originel users. They work like new but cost significantly less. Give us e call!

135-I
Will sell or leese as en H. Has full feeture complement.

65-I
Up to 2 megabytes and/or 6 chennels.

50-I
Also have e 50-H. Both heve 3 chennels.

3420-X
Most models reedily availeble with controllers.

3277-2
With controllers end printers. All keyboerds eveileble.

WANTED TO BUY
168, 158, 148, & 138's
165, 155, 145, & 135's.
All 370 peripherels,
CRT's & controllers.

IPS Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

FOR SALE

Hawlatt-Packard
Model 2114 CPU
8K with DMA
1 Each - $3,500.00
Hawlett-Packard
Iomec 2870
Disk Drive
2.5 M Bits
W/O Cabinats
Qty. 4
$1,000.00 Ea.
GTE Model I.S.
5541's "NOVAR"
Terminals, Qty. 150
$1,000.00 Ea.
With 6 Months
Warranty
VOLTRAX ML-1
Multilingual voica system with kayboard - never used. 1 Ea. $8,000.00
Call:
PHARMASSIST
817-469-2480
Ask for Charles Smiga

BUY SELL LEASE BROKERAGE
Let the
'NATIONS LARGEST WHOLESALE DEALER'
Buy, sell, lease, sub lease, or be your agent in placement of your pre owned IBM 360/370/System 3, or other units
COMPUTER INTERNATIONAL LTD
CWC's international division
experts in foreign markets, freight, customs
BEACH COMPUTER CORPORATION CWC's Leasing Division
COMPUTER WHOLESALE CORP., (504) 581-7741
SUITE 502, 501 FIRST NATIONAL BANK OF COMMERCE BLDG
NEW ORLEANS LOUISIANA 70112
MEMBER OF COMPUTER DEALERS ASSOCIATION

FOR SALE
370/158-3
IBM COMPUTER

2 Meg Storege
1433 Additionel Block Multiplexor
1434 Additional Block Multiplexor
2150 Control Storage Expansion
2151 Expanded Control Storege
6111 Register Expension
4650 Integreted Storage Control
7840 3213 PA
3213-1 Console Printer

Aveileble August 1, 1978.

Contact:
D.N. Madge
Cominco Ltd.
Trail, B.C., V1R 4L8 Canada
Telephone (604) 364-4861

Cominco

LEASING?
WE'VE GOT YOUR 303X ON ORDER

...plus 135, 138, 145, 148, 158 & 168's too
(over $130 million worth!)

- We'll write a short-term or long-term lease — on YOUR system or OURS
- We'll configure a total system or part of one to your specifications

"Our leasing concepts are sensitive to your needs"

COMPUTER CAPITAL CORPORATION
1351 WASHINGTON BLVD. STAMFORD CT. 06902
203-357-9663

PDP-11/70

- Floating point
- 10-1/2 in. expander box
- System Unit
- 8 port MUX
- Cabinet
- RP05 88MB drive & cont.
- 1600/800 bpi tape & cont

Only $140,000

Computer Products, Inc.
17131 Daimler St.
Irvine, CA 92714
(714) 557-6660

Ask for Joe Letbetter

FOR SALE
REI ERCR/RIPC

OCR Scanner for cerds & fuil pege incl: date creft PC2, 3 tape drives, & 1 line printer.

Interested Parties Contact:
Mr. W.C. Cooper
MARYLAND NATIONAL BANK
225 North Calvert St.
Baltimore, MD 21202

---

2 Burroughs L 5000's

auto reader
form burster
softwear
ledgers, etc.

Still in service end in excellent condition. Sold seperetely or es a packege.

Call Don Hoffman at 518-237-0524.

COMPUTER TAPE SALE

"QUALITY & SAVINGS"
Slightly used, Money-Back Guarantee
FULL REELS
2400' 1600'bpi/3200fci
w/Hanging Seal $4.50 ea.
Freight prepaid on orders over 200 Tepes. Shipped within 48 Hrs.
CALL or WRITE:
Computer Tape Mart
31 Sprague Ave., Amityville, NY 11701
(516) 691-2309

DEC

HARDWARE
PDP11·PDP8
LSI-11's
Processors Peripherals
Memories
VT52's LA36's
LS120's LA180's
Also available
Other printers end discs eveileble with controllers for most minicomputers.

NDS
NATIONAL DATA
SALES CORP.
516/944-7444

THREE AND FOUR YEAR WALK-AWAY LEASES

1. ATTACHED PROCESSOR FOR 3158
2. 3158 - 3 MEG WITH APU FEATURE
SPRING AVAILABILITY
3. 3158 - 3 MEG MOD 3
SUMMER AVAILABILITY

TNCC
THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle — (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortmen — (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Hungtington Station, New York 11746

Available for LEASE
FALL 1978 Delivery
IBM 3033 PROCESSOR COMPLEX
8 Meg System

(I.O.A. Sole owner)
Call George Gilman or
Charles Rubenstein

800-221-8438

We have the experience- and the expertise!

IOA DATA CORP
(212) 673-9300
383 Lafeyette St., New York, NY 10003
MEMBER COMPUTER DEALERS ASSOCIATION

BUY·SELL·LEASE·TRADE

PURCHASE LEASEBACK / RENTAL CREDITS

Write or call collect today to these representatives!

SYSTEM/3
All Peripherals
call Ted Arbuckle

370's
All Peripherals
call Don Norris

129,029 KEYPUNCHES
Unit Record Equipment
IBM M/A
call Abe Salih

SYSTEM 32's,34's
3270 CRT's
call Marilyn Morris

360's
All Peripherals
call Duke Crumpton

(214) 634-2750
TWX 910-861-4171
METROPLEX COMPUTER COMPANY, INC:
7135 John Carpenter Freeway
P. O. Box 47220, Dallas, Texas 75247

Industry's Fastest Growing Computer Dealer

MEMBER CDA

WILLIAM MARION COMPANY, INC.
P.O. BOX 309 • HACKENSACK, N.J. 07602

N.C.R.
270-299-399-775
31, 32, 41, 42 etc.
BURROUGHS
"L" TC 500, TC 700
I.B.M.
029-Systems 32/34

BUYING
SELLING

029's & 059's
immediate delivery
Also: 026 - 056 - 082 - 083
084 - 085 - 088 - 402 - 403
407 - 514 - 519 - 548 - 552
557 - Eligible For IBM M/A

FOR MORE INFORMATION CALL- (201) 343-4554

FOR SALE OR LEASE 370/168

(MODEL 1, 3 or A)

AVAILABLE JUNE 78
Bob VanHellemont
CMI CORPORATION — (313) 642-8000

ARIZONA COMPUTER EQUIPMENT

Buy/Sell Xerox Computer Equipment

FOR SALE

- Xerox Sigma 7 with 128K memory
- Xerox Sigma 6 with 96K memory
- Xerox Sigma 5 with 64K memory
- Xerox 530
- Many types peripherals and spare parts
- Module repair
- Power Supply repair

ARIZONA COMPUTER EQUIPMENT
P.O. Box 2721
Flagstaff, AZ 86003
(602) 779-0464 or 774-7343

BURROUGHS LEASE - PURCHASE

B3500 System and Peripherals

This system is over 5 years old & will require your influence to qualify for Burroughs maintenance.

B1726 & B1728's

Complete Systems - No problem on Maintenance Agreement.

B4700

Complete System - No problem on Maintenance Agreement.

Assorted Selection of TC700's, Series L, B700's.

Lawrence G. Lyon
2480 W. Alameda Ave.
Denver, Colo. 80223
(303) 922-8331
If You Need It
We'll Find It

FOR SALE By Owner
370/125 256K

With EXT. Signals
1403 Power
ICA 2 lines
IPA 1403N1
3411 MTA
3330 ATTACH

Available June, 1976 Phone: (517) 372-9230 Ext. 291 Write:

Bank of Lansing
P.O. Box 15114
Lansing, MI 48904

2314-B1

- Up to 9 SPINDLES
- 60 m.s. average access time
- Two channel switches available
- Immediate delivery — Sale or Lease

COMDISCO
312-698-3000

GRAPHIC RESOURCES CORPORATION

The Graphics Specialists

Plotters-Sale, Purchase, Leasing
Plotter Supplies-Manufacturer
Plotter Re-Conditioning
Services & Parts
Interactive Graphic Systems
Line Printers
All Manufacturer's Equipment Available

GRAPHIC RESOURCES CORP.
Offices Located In:
Los Angeles, Houston
Denver, Washington, D.C.
CORPORATE OFFICE:
(213) 598-3318 (714) 898-3584
5442 Research Drive
Huntington Beach, Calif. 92649
CALL OR WRITE FOR FREE BROCHURES & SAMPLE PLOTTER MATERIAL SWATCH

ATTENTION
IBM 360/370 USERS

DATA AUTOMATION COMPANY, INC.

buy • sell • lease • trade

370 Peripherals

3410/3411 3330/3333 3211/3811
3420/3803 3340/A2, B2 3272/3277

360
We'll Buy Any 360 CPU Today

Peripherals Lowest Price

2401-5 2804-2
2402-2 1403-N1
2403-1 2403-4
W/DD

360/20
LEASE or SALE
2020 C1
w/2203 120pp
2560
w/2 line printer

360/40-50-65's Available

Data
Automation
Company

4858 Cash Road
Dallas, Texas 75247
214-637-6570

370/125's

For Sale* Lease* Purchase
****Purchase Leaseback***

Specialists in 125 Systems
3410's and 3411's Also Available

CORPORATE COMPUTERS, INC.
(203) 661-1500
115 Mason St., Greenwich, CT 06830
Member CDA

FOR SALE

3275-2 Display Stations
3286-3 Printers
8384-3 Printers
50-70 Available Now - July 1

Call or Write
(714) 833-9800
TWX 910-595-2550
SADDLEBACK MARKETING CORP.
1401 Dove Street, Suite 245
Newport Beach, CA 92660

Member Computer Dealers Association

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK!

FOR SALE

3505-B1 and 3525 P3
3155-J with Dat Box
3158-U36 — Del. 9/78
3158-K — Del. 6/78
3165-K — Del. 6/78
(BUY OR LEASE)

WANT TO BUY

370/145 I2-J2
370/135 GF-I
3-1403 N 1
1442 N 1
3420-5 Single Density
3420-8 Dual Density

TW COMPUTER INDUSTRIES INC.
3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO 312 298 5650
WASHINGTON 703 525 3074
LOS ANGELES 213 370 4844

SELLING

PREVIOUSLY OWNED EQUIPMENT & SYSTEMS

N.C.R. & BURROUGHS

N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line Printers
N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
Also B-700 Thru B-4700 Systems w/wo Peripherals
WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS

BUYING OR SELLING-CALL US FIRST.

KEY-EXIMPORT CORP.
256 LIVINGSTON ST (P O BOX 129) NORTHVALE, N J 07647
TELE N J (201) 767 3444 N Y C (212) 736 7736
TELEX 135149 CABLE KEYEXIMP NORTHVALE NJ

BUYING

NATIONAL COMPUTER RENTAL
415 MADISON AVENUE
NEW YORK, NEW YORK 10017
(212) 532-1500

MEMBER OF TIGER LEASING GROUP

SHORT AND LONG TERM LEASES WITH ATTRACTIVE RATES

360 / 30, 40, 50, 65

370 / 125, 135, 145, 155
138, 148, 158, 168

3031, 3032, 3033 DISK · TAPES

WE ALSO BUY - SELL

MEMBER OF COMPUTER LESSOR ASSOC

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	$ 200	$20/Mo	088	$1400	$80/Mo	128	$3400	$110/MO
028	$ 800	$30/Mo	082	$ 800	$30/Mo	814	$ 800	$ 45/Mo
029	$1800	$58/Mo	083	$1700	$80/Mo	818	$1000	$ 55/Mo
048	$ 900	$40/Mo	084	$2800	$90/Mo	828	$1200	$ 80/Mo
047	$1400	$80/Mo	088	$1200	$80/Mo	548	$1800	$ 80/Mo
088	$ 200	$18/Mo	088	$2800	$180/Mo	887	$2800	$100/Mo

Sale: 360/20 system: $9800. WANTED TO BUY: IBM rental Credit 028-- and --128.

THOMAS COMPUTER CORPORATION

600 N. McClurg Court · Suite 4202
Chicago, Illinois 60611
(312) 944-1401

Calif. Branch
115 Harbor Island Rd.
Newport Beach, CA 92660
(714) 675-2810

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS
WE BUY · SELL · LEASE · TRADE

transdata

P O Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

COMPUTER INTERFACE TECHNOLOGY

BUY-SELL-TRADE □ WE'RE THE BEST IN THE WEST
FOR DEC, DG, INTERDATA EQUIPMENT
SAVE 10% to 50% ON YOUR MINI NEEDS

THIS MONTH'S SPECIALS

CDL-11 A,B,C,D,E Asynch Interface	$ 420
Shugart SA800/1 Drive	$ 399
200MB Disk & Controller	$ 24,500

2080 South Grand, Santa Ana, CA 92705
In Santa Ana call Merle · In San Jose call John
(714) 979-9920 · (408) 225-3844
BROKER-DISTRIBUTOR-MANUFACTURER

In Canada... let us quote a custom-configured IBM computer system in new condition, with quick delivery, at big savings under IBM factory prices.

Don Dupuis
Windsor, Ont.
(519) 258-8910

Jacques Dagenais
Montreal, Que.
(514) 374-5920

Ron Ridding
Toronto, Ont.
(416) 683-3704

CMI — Remember the name

CMI COMPANY

BROKER IN DEC COMPUTER SYSTEMS AND COMPONENTS

C.D. SMITH
730 N. Post Oak Road
301
Houston, Texas 77024
(713) 686-9405

PROFESSIONAL DEALER/LESSOR OF IBM COMPUTER SYSTEMS

Bob Russell
Jack Emery
Dave Hepburn
Paul Baillie

SYSTEMS MARKETING INC
200 E Thomas Road
Phoenix Arizona 85012
(602) 264 5600 Telex 667 334

SMI

SELL
NEW • REBUILT

TELETYPE

MODELS
43·33·32

NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293 0444

FOR SALE

Two (2) Electronic Retina Computer Reader (ERCR) w/associated CPU's, tape drives, line printers, and misc. peripherals.

Also eight (8) Bar Code Reader/Sorter (BCRS) systems, Models 1A and 1B, w/associated CPU's, tape drives and misc. peripherals.

Manufacturer
Recognition Equipment, Inc.

For further details contact:
E. Hutchinson

AMERICAN EXPRESS COMPANY
Phoenix, Ariz.
(602) 248-3062

DEC DATA SYSTEM

MODEL D 322-BY

- PDP LSI-II CPU with Term. Int.
- 40 KB of MOS Memory
- Dual 26KB Dual Floppy
- VT-52 CRT Console
- Bootstrap Loader
- System Mounted in H9820 Desk
- CTS-300 License
- Applications Software

IMMEDIATE DELIVERY
$15,900.00

- OPTION: ER MODEL QB-10
  10 MB Disc System for 322 System - $8500.00
- OTHER EQUIPMENT: DECwriters Silent 700, Disc Systems, Modems, CRT.

EQUIPMENT RESOURCES, INC.
1022-3 Cherokee Road
Smyrna, Georgia 30080
(404) 434-1382

IBM 7072 Computer System for sale.

Consists of:

Quantity	Model	Description	Weight (lbs)
6	7330-001	Tape Drives	650 each
1	7180-001	Console Ctl Unit	700
1	7301-002	Core Storage	1500
1	7501-001	Console Card Rdr	2500 approximately
1	7624-001	Power & Tape Ctrl	1800
1	7628-001	Tape Control	2100
1	7802-001	Power Converter	1700
	7105-002	High Speed Proc.	2500

Total weight approximately 14,450 lbs. Not under maintenance contract. Will be sold on an "as is, where is" basis (no warranties expressed or implied). Buyer will be responsible for dismantling and removing system from 5th floor, Kirkland Hall (elevator and loading dock available) by date arranged when bid awarded. No software and/or manuals available. Operational as of 3/1/78. Payment to be at time of pick-up unless other arrangements have been made prior to pick up.

Send Bid To:

Vanderbilt University
Director of Purchasing
Nashville, Tennessee 37235

BURROUGHS L & B80 Users

Now Available: System Language 3 (SL3) Assembler for L-8000, L-9000 * B80 with Cassette or Disk I/O.

Contact:
Computer Software Co.
P.O. Box 19534
Raleigh, N.C. 27609
(919) 828-2009

DEC SALE

64kb core system

11/10 SC
MF11U
KE11b
RK11D
(2) RK05's
(2) Cabinets

eligible for DEC maintenance. $12,500. available 4/15

CONTACT:
Mike Scoby
(312) 787-3223

FOR SALE

Calcomp 1040A
W/DD (one)
Calcomp 347A
W/DD (four)
$37,500
Available Now
Equitable Computer Marketing
4255 LBJ Fwy #210
Dallas, TX 75234
(214) 661-3981

3033's Any Model

Any Quantity
Starting Oct '78
CW Box 1522
797 Washington St
Newton MA 02160

MICRO-EXCHANGE

FOR SALE: IBM 5100, 5103 Printer, 5108 Tape Drive, Standard Register 500 Slitter-Burster. $9,800 group. One year old. Initial cost $20,000. (717) 426-2921.

APL SOFTWARE, APPLICATION PACKAGES, custom programming, and computers are available now! We buy, sell, lease and support IBM 5100's and 5110's. Gary Tremblay Alta Consultants, Box 848, Huntington Beach, California 92647 (714) 847-3755

TELETYPE, ASR33 with papertape. Inexpensive ASCII small systems terminal. Modern, compact styling. Excellent. Several available. $685. (804) 272-8403, evenings.

8080 - 6800 Business Software. Low priced, written in BASIC Diskette/Paper tape. GL, AR, AP, Inventory, Payroll, Medical, Real Estate, Stock Investment, Time Utilization, Insurance Agency, more. Software Supply, Box 5038, Bossier City, Louisiana 71111 (318) 746-0842.

TELETYPE-ASR33 Excellent Condition. $650, Modem $100, H. Manzel (212) 957-4937 Days

"WANTED Software for TRS-80. Write R&S, Box 28, Wilmington, Mass. 01887"

FOR SALE — MICRODATA 8K MEM. BDS, 1600 CPUS, MILACRON Boards; Printed Circuit Board Repair, WTB: REALITY System Boards & Peripherals, Mike Shebesta, Cintl, Ohio 45230, 1-513-474-1760

TRS 80 users group monthly newsletter. Join Now! $17.00 first year 12.00 thereafter. Marsh, 821 13th South, Onalaska, WI 54850

Experienced, microprocessor consulting, engineering, team available to place any product into COMPLETELY DOCUMENTED PRODUCTION in less time than anybody. Icasys Computing Corporation, 1820 Union Street, San Francisco 94123. (415) 922-7775, 2258 31st Street, Santa Monica 90405 (213) 450-4505

buy sell swap

.Univac 9300, 12K

High Speed Row Punch and Printer, under Univac maintenance, for sale by Service Bureau upgrading to 90/30 on-line system. 12K card oriented programs for Billing, A/R, A/P, G.L., and others available at low, one-time charge to Buyer. Call

Tad Campbell at
(203) 375-5877 or write
to M.I.S. at
1469 Stratford Ave.
Stratford, CT 06497

370/1381

With Feature

Available For
Purchase/Leaseback
Purchase Price $245,000

Leasback is for
24 Months

For Written RFP Call

(201) 777-1830

COMPLETE SIGMA 3 SYSTEM

For Sale or Lease

desks, tapes, printer & card reader also 600 Sq. Ft. of Raised Floor

Niagara Computer Sales, Inc.
130 Crossett St.
Syracuse, N.Y. 13207
(315) 424-0001

DATRONIC RENTAL CORPORATION

WANT TO BUY

96K 135
3803 - 3420
3830 - 2 with Madrid
3705
148K
158

Call Will Foss
(312) 992-0760

SOFTWARE

To meet (or beat) deadlines, to handle user requests, to stay within budget, use

PC•70

The automated system that helps you manage people and projects effectively. PC-70 is applicable to virtually any type of project or project-oriented group, including DP, engineering, R&D, legal, facilities planning, maintenance, and construction. Simple, powerful and economical, PC-70 is today's leading project/resource management system, with over 400 clients worldwide.

Atlantic Software Inc.

5th & Chestnut Sts
Philadelphia, PA 19106 / (215) 922-7500
Europe: Tacsi Software, Paris / 225-88-83

SOFTWARE FOR SALE

TONE 3

TSO for VS1

CHECK THESE FEATURES

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with RES support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations console support
- Dataset maintenance
- Catalog management
- Standard IBM TSO commands
- Enhanced 3270 useability
- Full ASCII terminal support
- No user swapping
- No TCAM
- No VS/2 overhead

TONE

11588 TRASK AVE
GARDEN GROVE CA
92643 (714) 636-8501

PROVEN Packages from Professionals

Financial
- General Ledger and Financial Reporting System
- Accounts Payable
- Accounts Receivable

Manufacturing
- Material Requirements Planning
- Master Production Scheduling
- Capacity Planning
- Shop Floor Control

Comprehensive Report Generator
- FILETAB

Small Business Systems
System 3
- General Ledger and Financial Reporting System
- Accounts Receivable
- Accounts Payable

Burroughs B-1700 1800
- General Ledger and Financial Reporting System
- Accounts Receivable

Get all the details. Today.

Name
Title
Company
Address
City
State Zip
Phone Computer

Other **small computer system** application products available soon. Please specify computer and need.

SOFTWARE INTERNATIONAL

Elm Square. Andover. Mass. 01810 (617) 475-5040
Atlanta • New York • Washington, D.C. • Philadelphia • Chicago
San Diego • Toronto • Houston • Columbus, OH • San Francisco

CWC438

*Registered trademark of Software International

CONVERTING?

Try the experts. DASD Corporation encourages test evaluations of all of our language translators

RPG/RPG II to COBOL (DOS or OS) will accept all types of **RPG** and produce **ANS COBOL**. Most translations are 100% error free. Our modular **COBOL** simplifies maintainability.

SYSTEM/3 COBOL to OS COBOL makes this tedious redundant conversion completely automatic. We're 97% clean, which frees a lot of man hours for more important tasks.

DOS COBOL to OS COBOL is basically a difference of syntax, but may mean a lot of wasted man hours.

GE MAP to OS COBOL will allow immediate upgrade of your **GE 400** series to full **ANS COBOL**.

360/20 BAL to 360/370 OS ALC is an extremely solid product eliminating a monotonous programming job.

DASD TRANSLATORS SAVE TIME AND MONEY.

Many service options are available: lease, conversion only, conversion and clean compile, full conversion responsibility including testing and JCL.

For a prompt solution to your conversion problems, write or call today.

DASD CORPORATION
National Marketing
1480 Renaissance Drive—Suite 315
Park Ridge, Illinois 60068
312/299-5005

DASD CORPORATION

---

software for sale

ACCOUNTING SOFTWARE FOR DEC RSTS/E OR CTS-500 USERS

From one of the pioneers in commercial data processing using RSTS. Completely on-line, interactive systems available for **ACCOUNTS-PAYABLE, GENERAL-LEDGER, FINANCIAL-REPORTING, ACCOUNTS-RECEIVABLE and PAYROLL applications.**

These are consolidating packages and support multi-division company and multi-company corporate accounting functions.

If you are installing or have installed a Digital Equipment Corporation RSTS/E or CTS-500 system, contact us for cost-effective solutions to your core accounting problems.

Plycom services, Inc.

(219) 936-2183
P.O. Box 160
Plymouth, IN 46563

RPG II SYSTEMS

***A/R-OPEN ITEM OR B/F**
***ACCOUNTS PAYABLE**
***GENERAL LEDGER**
***PAYROLL AND LABOR DIST.**
***INVENTORY**
***CREDIT UNION' MAILING, ETC**

Extensive Documentation Provided

Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

MEDICAL/DENTAL BILLING

Complete Billing and Insurance Processing for doctors, groups and clinics.

- **Complete Insurance Forms**
- **Profile, RVS, ICDA Files**
- **Bal. Forward, Ledger**
- **COBOL or RPG II**
- **30+ users**
- **360/370 or mini-computers**
- **On line, Real-Time or Batch Processing**

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

ACCOUNTS PAYABLE

Now a low-cost software package for mini or mainframe computers with many cost-saving features:

- **Batch processing using single data base for fast processing**
- **Modularly structured COBOL programs reduces maint. costs**
- **Multi-company facility avoids duplicate software.**
- **Flexible retrieval facility for printing reports & more.**

For full details on how our APS software can save you time and money, call (415) 254-1264, write:

LEGLER SYSTEMS CO.
23 Charles Hill Rd.
Orinda, CA 94563

TIME

GENERAL LEDGER

$400 FULL PRICE

***Check Register *Journal Register**
***General Ledger *Trial Balance**
***Balance Sheet *Income Statement**

Complete bookkeeping system for any medium to small company. Over 500 customers processed during the last ten years. Modular parameter design can be adapted to any small computer. Written in low level IBM Cobol. Price of $400.00 includes Source programs, sample JCL with test data, and complete operating procedures.

FREE SAMPLES
& DOCUMENTATION

GENE SUMRALL
4211 S.W. Freeway
Suite 108
Houston, Texas 77027

---

time & services

370/158 mod 3 Datacenter

3.5 meg MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerievsky
(212) 564-3030

Datamor

132 West 31 St.
New York, N.Y. 10001

REMOTE JOB ENTRY

PHOENIX·HECHT

- **IBM 370/158-3.**
- **Nationwide Incoming Watslines**
- **Complete systems and software support**
- **Full application Library (including all accounting applications)**
- **All high-level languages**
- **Prime time and off hours**
- **VS 2, HASP, INTERCOMM, ROSCOE**
- **Complete data security including off-site storage**

For information
call John MacDougall
at (312) 861-7100

PHOENIX·HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

370/158 MVS 4 MEG

WYLBUR
IMS 1.1.4 DB/DC
7 Days/24 Hours
High/Low Speed Terminals
RJE and Batch
2- Xerox 1200 Printing Systems
Full Key Entry Service

THOMAS NATIONAL
1775 Broadway, NYC
212-765-8500

Computer Time Brokers & Specialists

- On-site or remote processing
- Serving the Tri-State Area

BROOKE COMPUTER CORP.
250 W. 57 ST., NEW YORK, NY 10019
212/586-0923

WE ARE

BROKERS OF COMPUTER TIME

New York & New Jersey Only

Computer Reserves, Inc.
(212) 687-1840
(201) 676-1881

CORE MEMORY REPAIR

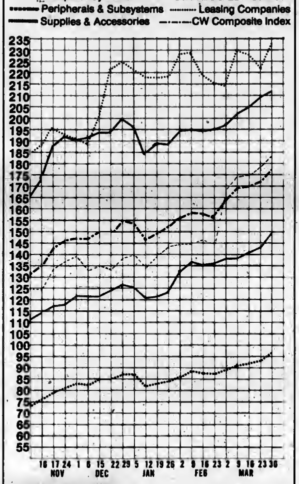
Ampex, Burroughs, CAI, CMI, Data Craft, Data General, CDC, DEC, EMM, Fabri Tek, Honeywell, GAI, HP, Interdata, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XDS.

Any Manufacturer's Memory

THREE DELTA CORP

1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

COMPUTERWORLD
Computer Stocks Trading Indexes



Earnings Reports

MICRODATA
Three Months Ended Feb. 28

	a1978	1977
Shr Ernd	$.44	....
Revenue	19,922,000	$8,626,000
9 Mo Shr	.72	.31
Earnings	980,000	9,000
Revenue	25,406,000	19,203,000
Earnings	1,620,000	695,000

a-Includes results of Computer Machinery Co. of which Microdata acquired a 75% interest in December 1977.

PENRIL
Six Months Ended Jan 31

	1978	1977
Shr Ernd	$.48	$.30
Revenue	6,600,547	4,983,967
Earnings	919,187	375,981

PLANTRONICS
Three Months Ended Feb 25

	1978	1977
Shr Ernd	$.30	a$.24
Revenue	14,589,000	14,244,000
Earnings	1,600,000	1,252,000
9 Mo Shr	.80	a.70
Revenue	39,830,000	34,567,000
Earnings	4,244,000	3,712,000

a-Adjusted for two-for-one stock split in January 1977.

TAB PRODUCTS
Three Months Ended Feb 28

	1978	1977
Shr Ernd	$.33	a$.38
Revenue	13,721,000	12,397,000
Earnings	411,000	473,000
9 Mo Shr	1.02	a1.32
Revenue	40,609,000	36,599,000
Earnings	1,281,000	1,647,000

a-Adjusted for three-for-one stock split in October 1977.

TELEFILE COMPUTER
Year Ended Sept 30

	1977	1976
Shr Ernd	$.85	$.56
Revenue	11,601,865	5,952,979
Tax Cred	456,000	341,289
Earnings	1,126,867	736,617

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Frank Collins
Account Managers
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
353 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Judy Milford
Account Managers
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ko, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jurgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 30-40-36
Telex: W Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 29, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 33	46 5/8	-2 7/8	-3.8
N	BURROUGHS CORP	35- 91	60 1/4	0	0.0
O	COMPUTER AUTOMATION	18- 30	26	- 1/6	-1.0
N	CONTROL DATA CORP	20- 29	23	+ 1/4	+1.0
C	CRAY RESEARCH INC	13- 31	29	+ 1/2	+1.7
N	DATA GENERAL CORP	33- 34	43 7/8	+ 3/8	+1.6
N	DATAPOINT CORP	18- 62	42	+1 3/8	+3.3
N	DIGITAL EQUIPMENT	37- 33	39	+ 1/4	+0.6
N	ELECTRONIC ASSOC.	2- 4	4 1/4	+ 3/8	+9.6
R	ELECTRONIC ENGINEER.	8- 16	13 1/6	+ 1/6	+1.9
O	FOUR-PHASE SYSTEMS	13- 23	22 1/6	0	0.0
N	FOXBORO	28- 34	33	-1 5/8	-4.6
O	GENERAL AUTOMATION	6- 9	8	- 1/8	-1.5
O	GRI COMPUTER CORP	1- 1	1 3/8	+ 1/8	+10.0
N	HEWLETT-PACKARD CO	62- 87	63 1/4	- 3/8	-0.3
N	HONEYWELL INC	43- 33	43	-1 1/2	-3.2
N	IBM	238-286	238 1/2	-1	-0.4
O	MANAGEMENT ASSIST	5- 12	12 1/4	+ 3/8	+3.1
O	MICRODATA CORP	7- 18	12 3/8	- 3/8	-4.8
O	MINI-COMPUTER SYST	5- 12	6 1/4	- 1/4	-3.8
O	MODULAR COMPUTER SYS	5- 12	11 1/2	+1 1/2	+13.0
N	NCR	32- 47	43 1/2	+1 1/2	+3.3
O	PRIME COMPUTER INC	12- 32	31 1/8	+2 5/8	+9.2
N	PERKIN-ELMER	17- 22	18 1/8	+ 1/8	+0.6
N	RAYTHEON CO	16- 37	33 3/8	+ 3/8	+1.7
N	SPERRY RAND	30- 42	34 7/8	- 1/4	-0.7
O	SYCOR INC	8- 21	20 3/8	- 1/8	-0.8
A	SYSTEMS ENG. LABS	5- 14	12 3/6	- 1/8	-0.9
A	WANG LABS.	10- 16	16 1/8	+1 1/6	+8.4

LEASING COMPANIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
C	ALANTHUS CORP	3- 6	3 3/4	0	0.0
O	BOOTHE COURIER CORP	8- 16	16 1/8	0	0.0
O	COMDISCO INC	9- 18	9	- 1/6	-2.7
A	COMMERCE GROUP CORP	1- 3	3/4	+ 1/4	+50.0
A	COMPUTER INVSTRS GRP	1- 2	3/8	-	-8.2
N	DATRONIC RENTAL	0- 2	1 3/8	+ 1/8	+8.3
A	DCL INC	1- 4	2 1/2	- 1/8	-4.7
N	DPF INC	6- 10	9	+ 3/4	+9.0
N	ITEL	13- 22	17 3/8	+ 3/8	+2.1
N	LEASCO CORP	19- 31	30 1/4	+ 3/8	+1.2
O	LEASPAC CORP	1- 2	1 3/8	0	0.0
A	PIONEER TEX CORP	3- 11	6 1/4	+ 1/2	+8.6
N	U.S. LEASING	10- 16	13 3/8	+ 1/4	+1.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1 1/8	- 1/8	-10.0
C	ANACOMP INC	7- 12	10 1/2	+ 1/8	+1.2
A	APPLIED DATA RES.	5- 10	9 1/2	- 1/8	-1.2
N	AUTOMATIC DATA PROC	23- 30	28 1/8	+ 7/8	+3.2
O	COLEMAN AMERICAN COS	1- 2	1	0	0.0
O	COMPU-SERV NETWORK	9- 15	9 1/4	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	- 1/4	-2.7
O	COMPUTER HORIZONS	1- 2	2 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	8 3/8	+ 1/8	+1.5
N	COMPUTER SCIENCES	7- 11	10 1/2	+ 3/8	+6.3
O	COMPUTER TASK GROUP	1- 2	2	+ 1/4	+14.2
O	COMPUTER USAGE	1- 3	2 3/4	+ 7/8	+46.4
O	CONSHARE	3- 10	9	- 1/4	-2.7
O	DATA DIMENSIONS INC	3- 3	4 3/8	- 3/8	-7.8
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	17 7/8	- 3/4	-4.0
O	INSYTE CORP	2- 3	1 1/2	+ 1/8	+9.0
C	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/8	0	0.0
O	KEYDATA CORP	1- 3	1 3/8	- 1/8	-7.1
A	LOGICON	7- 17	12 3/8	- 3/4	-3.7
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 19	19 1/4	+1 3/4	+10.0
O	NATIONAL DATA CORP	4- 8	8 1/8	+ 3/8	+4.8
A	ON LINE SYSTEMS INC	16- 24	23 3/4	+1 3/8	+6.1
N	PLANNING RESEARCH	3- 4	5	0	0.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 6	4	+ 1/8	+3.2
O	REYNOLDS & REYNOLDS	17- 21	19 3/4	+ 1/6	+1.2
O	SCIENTIFIC COMPUTERS	1- 4	4	+ 5/8	+18.3
O	TYMSHARE INC	14- 23	19 3/8	+ 1/2	+2.6
A	URS SYSTEMS	4- 6	6	0	0.0
N	WYLY CORP	1- 3	2 3/4	- 1/8	-4.3

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 18	17 3/8	+ 1/8	+0.7
O	ADVANCED MEMORY SYS	7- 10	9 3/4	+1	+11.4
N	AMPEX CORP	8- 13	13	+ 3/8	+5.0
O	ANDERSON JACOBSON	3- 8	6	+ 1/4	+4.3
N	APPLIED DIG DATA SYS	10- 20	13 7/8	+ 1/2	+3.7
O	BEEHIVE INT'L	3- 12	3 1/2	+ 1/4	+4.7
A	BOLT,BERANEK & NEW	6- 9	5 3/4	- 1/4	-4.1
N	BUNKER-RAMO	8- 14	13 1/2	+ 1/8	+0.9
A	CALCOMP	3- 5	4 3/8	+ 1/4	+4.0
O	CAMBRIDGE MEMORIES	1- 6	2 3/8	- 1/8	-6.6
N	CENTRONICS DATA COMP	18- 30	19 1/2	+1 1/8	+6.1
O	COGNITRONICS	1- 1	3/4	- 1/8	-14.2
O	COMPUTER COMMUN.	5- 8	9 1/4	+1 1/2	+19.3
O	COMPUTER CONSOLES	4- 7	3 1/4	+ 3/4	+18.6
A	COMPUTER EQUIPMENT	2- 4	4	- 1/4	-3.8
O	COMPUTER TRANSCEIVER	1- 1	1 1/2	+ 1/4	+20.0
C	COMTEN	9- 15	14 5/8	+ 3/8	+4.4
N	CONRAC CORP	19- 28	20 1/2	+ 1/2	+2.3
O	DATA ACCESS SYSTEMS	4- 3	3	0	0.0
O	DATA 100	6- 12	11 7/8	- 1/8	-1.0
A	DATA PRODUCTS CORP	9- 19	13 3/4	+ 1/4	+1.6
O	DATA TECHNOLOGY	3- 4	4 1/4	+ 1/8	+3.0
O	DATUM INC	1- 3	2 3/8	+ 1/8	+5.0
O	DECISION DATA COMPUT	2- 3	1 3/4	- 1/4	-12.5
O	DELTA DATA SYSTEMS	1- 1	1/4	- 1/8	-33.3
A	DOCUMATION INC	4- 12	11 3/8	+ 3/8	+3.8
O	DATARAM CORP	2- 24	16	+1 1/2	+10.3
M	ELECTRONIC M & M	4- 3	3	+ 3/8	+8.1
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/4	+ 1/8	+11.1
N	HAZELTINE CORP	8- 15	13 7/8	+ 1/4	+1.8
N	HARRIS CORP	28- 48	47 1/2	+1 1/2	+3.2
O	INFOREX INC	4- 8	7 3/8	+ 1/4	+3.3
C	INFORMATION INTL INC	8- 14	10	0	0.0
O	INTEL CORP	38- 57	42	+3	+7.8
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP.	4- 13	13	- 1/4	-1.8
N	MEMOREX	23- 34	31	+1 3/8	+4.6
N	MOHAWK DATA SCI	3- 9	8 7/8	+1	+12.6
O	PENRIL CORP	2- 6	7 3/8	+ 5/8	+9.2
N	PERTEC CORP	7- 11	10 1/4	+ 3/8	+8.4
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 3	3	- 1/8	-4.0
O	RECOGNITION EQUIP	8- 10	8	+ 1/4	+3.2
O	SCAN DATA	1- 2	1 3/4	+ 1/8	+11.3
O	STORAGE TECHNOLOGY	10- 30	30	+1 1/4	+4.3
O	T BAR INC	7- 16	16 1/4	+ 1/2	+3.6
O	TALLY CORP.	4- 8	7 3/8	0	0.0
A	TEC INC	6- 10	7	+ 3/8	+9.8
N	TEKTRONIX INC	29- 40	34 3/4	-2 3/8	-6.3
N	TELEX	2- 5	4 3/8	0	0.0
O	TESDATA SYSTEMS CP	13- 20	13	+ 3/4	+3.2
O	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	7 7/8	+ 3/8	+3.0
O	BALTIMORE BUS FORMS	1- 4	2 3/4	+ 3/8	+15.7
A	BARRY WRIGHT	10- 19	17 7/8	- 1/8	-0.8
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 20	19 3/8	+ 3/8	+1.9
N	ENNIS BUS. FORMS	6- 11	10 7/8	+1	+10.1
N	3M COMPANY	44- 36	44 3/4	+ 1/8	+0.2
C	MOORE CORP LTD	24- 37	29 1/2	- 1/4	-0.8
N	NASHUA CORP	16- 28	24 3/8	+ 3/8	+2.6
O	STANDARD REGISTER	18- 23	23 3/4	+ 3/4	+3.2
O	TAB PRODUCTS CO	8- 19	8 7/8	+ 7/8	+10.9
N	UARCO	18- 26	23 7/8	+2	+9.1
O	WABASH MAGNETICS	10- 13	12 1/2	+1	+8.6
N	WALLACE BUS FORMS	17- 21	20 7/8	+ 1/8	+0.6

NOT LIGHT BEER, FRAN.* GENERAL LEDGER.

Fran Tarkenton's product isn't light beer, it's the General Ledger/FICS System from MSA.

Hardly a lightweight system, General Ledger/FICS is being used by more than 600 clients in every kind of organization.

It provides an easy-to-use tool for asset management, control and cost accounting, and profit planning. Among the advantages offered by General Ledger/FICS are:

- Data Base Management
- On-Line Entry and Inquiry
- Distributed Processing Capability
- Custom Report Writer
- Financial Forecasting & Modeling

And, the General Ledger/FICS System interfaces with MSA's other financial accounting packages for a winning combination. If you would like more information, please call Carole McConnell at (404) 262-2376, or return this coupon.

MSA
THE FINANCIAL SOFTWARE COMPANY
Management Science America, Inc.
3445 Peachtree Road, N.E. Dept. C-1
Atlanta, Georgia 30326 (404) 262-2376

Chicago (312) 986-2450
Los Angeles (213) 822-9766
New York (201) 871-4700

International Agent
MSA International, Inc.
Brussels, Belgium Tel. (02) 673.99 63
Telex 63020 Answerback MSA B

Name
Company Title
Address
City State Zip
Phone Computer Model

I am interested in
☐ General Ledger/Financial Information and Control (FICS)
☐ Payroll Accounting
☐ Personnel Management and Reporting
☐ ALLTAX™
☐ Canadian Payroll Accounting
☐ Accounts Payable
☐ Accounts Receivable
☐ Supplies Inventory Control and Purchasing
☐ Fixed Asset/Property Accounting

*Fran Tarkenton, Minnesota Vikings' Quarterback